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A REVISION

OF THE

LEPIDOPTEROUS FAMILY

SPHINGIDAE.

BY THE

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AND

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Ref.

(*WITH 67 PLATES.*)

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INTRODUCTION.

OUR researches in *Sphingidae*, which have been carried on conjointly for several years, and of which we now publish the results, were undertaken with the purpose of giving a sound basis to the classification of these insects by an extensive study of their morphology.

Classification is an interpretation of facts. The facts are to a great extent details of the anatomy and morphology of the beings classified. As it is, therefore, largely circumstantial evidence which guides the classifier, the first step towards a correct classification is to find out as many facts as possible. In interpreting these facts or characters presented by the individuals—the individual is the basis of all research—one starts with the assumption that what has been found to be true in the necessarily limited number of specimens investigated, holds good also in the vast multitude of individuals not compared. The possibility of an error in this respect can be lessened by the comparison of a large material of individuals. How large it should be, nobody can predict. To ascertain the extent of variation of the chief classificatory unit, the species, the material is never too extensive.

On the knowledge of the extent of variation of the species of a family depends the stability of the superstructure of genera, tribes, and subfamilies. An ideal classification could be drawn up, if all the species were known which are in existence and which have been. As this premiss cannot be fulfilled, we have to be content with the species that are known. And here, again, the foundation of the superstructure will be the safer the more species have been examined.

We have endeavoured to comply with these three primary demands on a classifier as far as it was possible for us: many facts, many individuals, many species. We have not restricted ourselves to a comparison of the pattern, general appearance of the body and wings, and of the neuration, but have taken into the scope of our research every part of the skeleton of the imagines, and hence have given a broader basis to our conclusions than has ever before been done in this family. Since the structure of the Hawk Moths has never been studied to any extent—the *Sphingidae* being in this respect one of the most

neglected families of large insects—we could scarcely avoid discovering organs hitherto overlooked, and throwing a new light on others which, though known to exist, had not been studied comparatively.

The organ of friction on the clasper and eighth tergite, found in many *males*; the structure of the inner surface of the palpi; the development of the pilifer and the antennal end-segment; the special structure of the merum of the meso- and metacoxae: the diverse development of the abdominal spination; the reduction of the pulvillus and paronychium of the claw-segments; certain differences in the end-segment of the antennae; the peculiar mid- and hindtarsal comb, etc., have never been taken into account in the classification of the *Sphingidae*.

However, we were very much hampered in one respect. We should have liked to extend our researches in the same degree to the early stages. The *Sphingidae* being for the greater part exotic species, the larvae and pupae are known only of a comparatively very small proportion. We were faced nearly everywhere by a lack of material. Though we have tried, during the years devoted to study of these insects, to obtain larvae and pupae from all countries where we have correspondents, we had very scant success, and scarcely any success in procuring the first larval stages. The larvae and pupae of many of the commonest Hawk Moths are still unknown quantities.* Nevertheless, our studies of the early stages have not been quite fruitless, inasmuch as they showed us that it is as dangerous to generalise from a few specimens or species in the case of larvae and pupae as it is in the case of imagines. The studies proved to us on the one hand that the deductions commonly drawn from the characters of European *Sphingidae* are faulty in many respects, and on the other hand that one meets in the larvae and pupae with similarities in not nearly related species and conspicuous dissimilarities in close relatives, just as one finds such puzzles in the adults—puzzles which are stumbling-blocks for the classifier, and a source of pleasure for an inquisitive mind.

The figures of the larvae and pupae are, with few exceptions, of little use, if drawn by amateurs who do not recognise and emphasise the essential points. The illustrations of pupae especially leave much to be desired. We draw attention to the following particulars, which we venture to hope will not be so often neglected in future by the artists who are trying to give an

* As the ordinary, non-resident, collector in the Tropics shuns inflating larvae on account of the time it occupies and the trouble it gives him, we think it advisable to call attention here to the following very simple method of preserving *small* larvae. Put the larva, after it is suffocated by benzine or chloroform, into a glass tube heated over a flame. The specimen will contract, then expand and burst, and dry in this expanded state. Let the tube cool and take the larva out. In absence of a glass tube, one may use a piece of tin or anything that will stand heating.

adequate picture of a chrysalis: position of the glazed portions of the eye: length of the tongue; anterior femur (externally visible or not); structure of stigmatical areas of the abdomen; shape and armature of the cremaster.

The number of individuals and species of *Sphingidae* contained in the Tring Museum is considerable, there being in the collection nearly 16,000 specimens, belonging to 660-odd species. Though this material is vastly larger than that contained in any other collection, it was nevertheless not sufficient to form the basis of a thorough revision of the family. Since many of the species of *Sphingidae* are very difficult to distinguish, and therefore the descriptions and often also the figures not exact enough, it was necessary for us to examine the specimens on which the names proposed by previous authors were founded, in order to find out how many species are known and which are the proper names for them.

It has been our good fortune to have our appeal for help addressed to private collectors and museums responded to with the greatest liberality.* Without this kind assistance it would have been altogether impossible to disentangle the synonymy and to bring the species which were insufficiently described into their proper place in our classification. We gratefully acknowledge here the help received from the authorities of the British Museum, of the Museums at Oxford (Hope Department), Dublin, Paris, Bruxelles, Berlin, Dresden, München, Stettin, Copenhagen, Stockholm, Vienna, Madrid, New York, and Brisbane; and we are no less grateful for the kind assistance rendered by H. Druce, L. W. Distant, W. Schaus, Colonel Swinhoe, M. C. Piepers, P. C. T. Snellen, G. Weymer, G. Semper, Dr. A. Pagenstecher, A. Bang-Haas (coll. Staudinger), P. Dognin, P. Mabille, Dr. W. J. Holland, and Charles Oberthür; who all either sent us photographs, types, and other specimens, or allowed us to visit their collections and to study the material contained therein.— *Maximas collegis gratias!*

An important point for the satisfactory progress of our work was a comparison of the long series of types of Walker's and Boisduval's descriptions, contained respectively in the magnificent collection of Mons. Charles Oberthür and in the British Museum. A closer study of these specimens than had hitherto been attempted was absolutely necessary. For Boisduval, when visiting the British Museum in the forties of the last century, had named in manuscript and made notes upon the *Sphingidae* of that collection, which names were for the greater part adopted by Walker in 1856, but often applied to other species than those for which Boisduval had intended them to stand. This muddle became intensified by Boisduval, who, in his monograph published

* Only two letters of inquiry have been left unanswered. The names of the addressees may be passed over in silence.

in 1875, gave descriptions taken from his own specimens and applied the before-mentioned manuscript names to species which he believed to be the insects he had so named in the British Museum, but which were often not the same. Moreover, Boisduval failed to recognise many of the Walkerian species, and described them again under new names. The confusion thus occasioned has, we hope, been successfully cleared up in the present Revision.

There are 770 species contained in this Revision. Of these we have not seen the following:—

Hyloicus francki, p. 135; known to us from the description.—Kansas.

Lapara pineum, p. 151; known to us from the description and figures.—N. York.

Lapara halicarniae, p. 153; known to us from the description and figure.—Florida.

Polyptychus goodi, p. 245; known to us from the description and figure.—W. Africa.

Smerinthulus (?) *decoratus*, p. 302; known to us from the description and a sketch.—Sikhim.

Sataspes ribbei, p. 474; known to us from the description and figure.—Celebes.

Euproserpinus euterpe, p. 615; known to us from the description.—California.

Arctonotus terlooi, p. 606; known to us from the description and figure.—W. Mexico.

Hippotion butleri, p. 760; known to us from the description and figure.—Madagascar.

The names of which we have seen the types are marked with an asterisk (*) in the bibliography.

Since Linné and Fabricius the *Sphingidae* of the globe have been five times classified, revised, or catalogued. Hübner, in his *Ver. bek. Schmettlinge* (about 1822), was the first to propose a detailed classification of Lepidoptera. The work was, in spite of all its glaring mistakes, far in advance of the time, and was therefore almost entirely neglected by the contemporary entomologists, and subsequently forgotten or treated as not being worth consideration. We do not see any reason for rejecting the generic names published by Hübner in the *Verzeichniss*. The definitions are insufficient and often incorrect, and the species considered generically the same belong often to widely different groups, while close allies stand widely separated. That is quite true: but the badness of the classification and of the definitions is—perhaps unfortunately—no valid argument against the adoption of the names. If it were, we should likewise have to reject a multitude of names proposed by more recent authors, whose definitions

do not apply to the species generically defined, containing erroneous and quite misleading statements, or whose genera contain very heterogeneous elements, as do, for instance, many of Walker's genera. Though, in the original definition of *Protoparce* (type: *rustica*), Burmeister stated that the pupa had no projecting tongue-case (which it has); though Standinger erroneously said of his new genus *Dolbina* that it had only *one* spur to the hindtibia, and Huwe made a similar mistake in the definition of *Smerinthulus*; and though the definition of Moore's *Hathia* is so vague as to apply to a host of other *Sphingidae* as well (as many of Moore's definitions do),—these names can and will not be rejected on that account. There is no line to draw between good and bad definitions, sufficient and insufficient descriptions; and every description is incomplete.

The first after Hübner to treat again upon all the *Sphingidae* was Walker, who, in the *List of Lepidoptera Heterocera of the British Museum* vol. viii. (1856), gave descriptions of all the known genera and species and numerous new ones. His bibliography is generally good, but his descriptions are often so bad that it is impossible to recognise the species without seeing his specimens. He has been much attacked on the Continent, and his names have been ignored to a certain extent by a few authors. Walker did not attempt a classification of the *Sphingidae*. He simply described the genera in the order he thought proper, without bringing them into groups. His genera are very often as unnatural as many of Hübner's.

Boisduval followed in February of 1875 with a monograph of the family, containing more exhaustive descriptions of the species and genera. The *Sphingidae* are divided in this work into a number of subfamilies, of which definitions are given, rather a rare occurrence in lepidopterological works of that time. In the nomenclature of the subfamilies he followed the old French custom of employing scientific terms in a gallinised form—a bad custom, which was formerly in vogue also in the nomenclature of species and genera. The monograph, though far above that of Walker, had two great drawbacks: it did not contain all the species described up to 1874, and names already employed by Walker were used again for other species (see above). We mention incidentally that Boisduval's names have priority over those of Butler which were published in the *Proc. Zool. Soc. Lond.* of 1875.

The Revision of *Sphingidae* by Butler—which came out early in 1877, not in 1876, as is quoted by some authors—is scarcely more than a synonymic list with occasional remarks. The genera are grouped into four subfamilies, but not defined, except the new ones. Though the definitions of the subfamilies are based almost entirely on the quite imperfectly known early stages, the grouping is, nevertheless, an advance on Boisduval's classification. The work would have

been much improved if Boisduval's species and genera had been incorporated into the body of the Revision instead of being given as an appendix.

The youngest work on the *Sphingidae* of the globe is contained in Kirby's *Catalogue of Lepidoptera Heterocera* (1892). As a list of names this catalogue has been of great help to us. The classification adopted in it has been much blamed by some authors as being arbitrary. But we think that one should not expect too much from a catalogue. Even the best is full of errors, as a cataloguer of insects cannot possibly have intrinsically worked out all the groups catalogued.

Besides these five general works, there are numerous treatises dealing with the *Sphingidae* of certain restricted districts. Apart from a host of popular handbooks, there are two works on the Palaearctic Hawk Moths worthy of special notice. These are by Bartel, in Rühl, *Grossschm.* vol. ii., and by Tutt, *Brit. Lep.* vol. iii. Bartel gives lengthy and generally accurate descriptions, but relies too much on others, whose errors he repeats without having examined the insects himself and formed his own opinion. Tutt's work is of quite a different kind. It is the most intrinsic ever written on Palaearctic Lepidoptera. The third volume comprises only a portion of the *Sphingidae*; the remainder of the family will appear in the fourth. The work will be of the greatest help to the scientist who knows the matter well enough to be able to distinguish between what is scientific and what appears merely in a scientific garb. The usefulness of the work could have been improved, we think, by a condensing of the contributions of the collaborators, and mistakes could have been avoided by the omission of references to foreign species with which the respective collaborators were not sufficiently acquainted. However, as it is, there is nothing written anywhere on European Lepidoptera coming up to it in thoroughness.

The Indian *Sphingidae* are dealt with by Hampson in Blanford, *Fauna Brit. India, Moths* vol. i. (1892). The volume should be consulted with some caution, since many distinct species are treated in it as being identical.

The species occurring in the Philippines are contained in Semper, *Schmett. Philipp.* vol. xii. (1896), where many figures of larvae and pupae are given.

Miskin gave a catalogue of the Australian Hawk Moths in the *Proc. Roy. Soc. Queensland* vol. viii. (1891).

A monograph of the North American *Sphingidae* by J. Smith is contained in the *Trans. Amer. Ent. Soc.* vol. xv. (1888). It is the best work on Nearctic Hawk Moths, though the classification is faulty in many respects, owing to Smith's limited acquaintance with the forms not found in North America.

The Cuban species are described and catalogued by Grote and Robinson in the *Jour. Ent. Soc. Philadelphia* vol. v. and vi. (1865, 1867), and again by

Gundlach in his *Contr. Ent. Cubana* (1881). The former paper was the best written on *Sphingidae* up to that time.

The Central American Hawk Moths are enumerated and partly described and figured by H. Druce in the *Biol. Centr. Americana, Lep. Het.* (1883—1896).

The species occurring in the Argentine Republic are dealt with by Burmeister in his *Descr. Rép. Argentine* vol. v. (1878) and *Atlas* (1879). The descriptions and figures of the earlier stages are of importance, but several mistakes in identification occur.

There is no list of the African species.

Besides these more important works, which are purely systematic, there are treatises of another nature, dealing with the markings and colour of larvae, like Weismann's *Studies in the Theory of Descent*, and Piepers's paper on the larvae of *Sphingidae* published in the *Tijdschr. Ent.* for 1897.

All the systematic works referred to suffered from a lack of knowledge of the morphology of the *Sphingidae*. Neuration, the organ generally relied upon in the classification of Lepidoptera, being of little assistance in the Hawk Moths, the authors seized upon any superficial characters, and thus were led astray. We hope to fill up that gap in our science by the present Revision—at least to a certain extent. Nobody can be more aware of the incompleteness of our researches than ourselves. The subject is far too large to allow of being treated after a comparatively small number of years of study in any degree approaching completeness. Nevertheless, we may fairly claim to have given a new foundation to the study of the *Sphingidae*. The groundwork for future researches is there: future authors will more clearly see their way, and be able to concentrate their efforts on the elucidation of the numerous points only cursorily touched upon in this Revision.

We have generally abstained from giving detailed description of any stage of the known species; but the keys to the genera and species, and the indication of some trenchant feature of shape, colour, pattern, or structure under each species, will, we trust, be an efficient guide also to those who wish to use the work as a means of determining the names of the material in their collections. Though we hope not to have missed any names, we have not attempted to give a *complete* bibliography of all the species.

The work is divided into three parts:—

I. General Subject.

II. Systematic Section.

III. Catalogue and Index.

I. GENERAL SUBJECT.

THE researches embodied in a work like the present are of two very different kinds. We had, firstly, to study the insects dealt with; and, secondly, to study the names bestowed upon them by previous authors. It may sound almost ridiculous, but it is nevertheless true, that in many cases the time one has to spend over the nomenclature of a form, in order to clear up nomenclatorial muddle and to find out what form authors have meant to designate with a certain name, equals or surpasses the time one can, for certain reasons, devote to the study of the natural history of the animal. Surely this is wrong. The Natural History of the animal being the subject of our science, the accessory subject of nomenclature should never have assumed such magnitude. It is waste of energy. However, we have patiently to bear the fruits of the sins of our forefathers in science, and those who come after us will again mutter bad language. One may kick, but one has to suffer. We have no sympathy with those of our contemporaries who contribute unnecessarily to the burden, which is in itself superfluous, and detracts from the efforts devoted to our science. The system of naming the groups of individual specimens of animated nature has been invented as a help to the student of science, but it has been carried out from the beginning in such a way that it necessarily developed into a bother as well. Why? Because the

PRINCIPLES OF NOMENCLATURE

were not strict enough.

Science is a republic where everybody may do as he likes. There are no laws which can be enforced; and nobody can be prevented from publishing what he pleases. This freedom is a great boon to science. Unfortunately, the results of scientific research and those of nomenclature are of quite a different standing. If the purported results of scientific investigations prove to be erroneous, they are repudiated and forgotten. If somebody propounds "laws" of development which are found to be erroneous, science passes on without troubling any longer about them. If somebody considers the battledore scales of *Lycaenidae* to be *fungi*, or the maxillary palpi of *Pulicidae* to be antennae, such statements are disproved, and are no further encumbrance to science. Statements of fact, and conclusions, once proved to be erroneous, no longer occupy the time of the scientific student; science is rid of them. Science can never get rid of a name of an animal or plant once published—unless quite a different system of designation be adopted than that employed since the time of Linné. We cannot simply ignore a name which is a record of an animal or plant. For we must keep a record at least of all the forms which have become known to science, since we cannot have a record of all the forms that exist and have existed. Even names which are synonyms cannot be dropped; they must

be carried on for two reasons. Firstly, if they were dropped and forgotten, they would in many cases be employed again for something else, and thus land us inevitably in a muddle. Secondly, closer research often proves that what was considered the same at one time is really different. A form may for a long time be lost sight of, but scientists will sooner or later become aware of the oversight, if the name is kept on record. For instance, in our case, the Hawk Moths described by Linné and Fabricius respectively as *Sphinx thyelia* and *boerhaviae* have been treated as the same for about 120 years. When we looked up the original records, we found them to refer to two widely different insects belonging to different genera. However, if it is granted that it is necessary, for the sake of completeness of our knowledge, to keep on record all the names given to forms of animals and plants, it will also be conceded that it is an unjustifiable act—because it adds unnecessarily to the burden—to suppress a name and replace it by another.

Some of the older writers did not seem to think much of recording an already named species under a new name and treating the older name as a synonym. Fabricius—a great and influential man in his time—set a very bad example to his followers not only by his insufficient descriptions, but especially by his arbitrary changing of names. For no reasons whatever he superseded names given by Drury, Cramer, and others, by names of his own invention, and employed—worst of all—the rejected names for other species, thus entangling the nomenclature to such an extent that it is difficult to find one's way through the impasse. With such an example before them, one cannot wonder that others followed suit. Boisduval especially seems to have found great pleasure in his names being printed. One cannot help smiling when one finds him coolly replace *Papilio euchenor* by a new name, "*axion* Boisd.," and sees the manuscript-names which he had bestowed at one time or the other upon *Sphingidae* appear in his monograph of the family under species which had meanwhile been baptised by others. It may be comforting to an author who comes too late to be nevertheless able to launch his names on the scientific world, but it should not be done. When Science was in its infancy, a little playing like this may have been pardonable, but nowadays there is no excuse whatever for playing at nomenclature. "The species described by Jones as *conformis* stands in my collection under the name of *asellus* mihi," or something to that effect, is not only a foolish thing to publish, but is an intolerable crime, which should always be met by an energetic rebuff. Vanity has something to do with this kind of proceeding, though there is really nothing to be proud of in giving a name to a specimen and avoiding criticism by shunning publicity. But we do not quite understand what is the object of those who are busy publishing manuscript-names which are given by others and which they find on specimens in collections. As it is of no advantage whatever to science, whether it becomes known or not that a bird or butterfly which has a valid name stands in this or that museum under this or that manuscript-name, there must be some other reason for wilfully increasing the list of synonyms. Is it to prove

that the respective authors of the manuscript-names were too lazy to write out a description and make it public, or that they were not sure if the forms named were really new? Is it to show that the respective authors who gave names to individual specimens of one and the same species really did not know enough of the things they baptised? Is it to demonstrate the carelessness of the respective authors who bestowed, in the collection, a name on an animal for which a name had already been published? Surely if the authors of the names had intended to publish them, we may leniently assume that they would have found time to reconsider the matter before rushing into print. We should not pry into the private foibles of others, and thus detract from their fame. Only published matter is common property, which scientists are bound to critically examine. We have seen many collections with numerous manuscript-names, but we are glad to state that the bad habit of naming specimens in collections without troubling about publishing a description is very much on the decrease—at least among scientific systematists. The habit has come down to us from a time when few people worked at the same group.

There is another class of no less objectionable names which gives little credit to those who are responsible for their introduction. It is a matter of self-evidence that, if somebody claims credit for a discovery, he has to state what his discovery is. Let us assume that A publishes a note maintaining that he has found a new component of air, which he calls so-and-so, but abstains from explaining what it is he has discovered. Another, B, working in the same line, also finds a component of air, which he describes and designates with a name. Then A (or one of his followers) gets up and claims priority for his name.—Another case. The morphologist C announces that he has found in a certain group of animals a new secondary sexual organ, to which he gives a name. There the matter drops; nobody can possibly tell what the new organ is. Some time after, several secondary sexual organs are discovered in that group, and described and named. Now the knowledge of the structures has become common property to scientists, somebody examines the preparations of C, and, finding that the naked name published by C applies to one of these organs, maintains that the name given by C should be employed for it instead of the later name, which was accompanied by a proper description.

There can be no doubt what the verdict of scientists would be in either case. Science is knowledge of nature. Anything new which does not increase our knowledge of nature is outside the pale of scientific work, and what we do not know is not yet part of science. Facts professed to be new, and new interpretations of facts, do not advance our knowledge if they are kept secret. We know *a priori* that there are many facts to be discovered and new interpretations of facts to be offered. A naked name or technical term, however, does not tell us what is the nature of the conception for which the name is meant; and as long as we are left without this knowledge, the name or technical term has no standing in science. Name and technical term are nothing but arbitrary means which science employs as a convenient abbreviation for expositions of

facts and for the result of lengthy inductions. The name as such is not part of science ; we might employ a number, or a letter, or some other sign instead without interfering in the least with that part of knowledge which is thus designated.

It is obvious that these deductions * which apply to science in general apply also to the nomenclature of classificatory work, if the work is meant to be scientific in all its branches. Facts and ideas in classification require explanation like any other facts and ideas in science. Families, subfamilies, and all the other classificatory units down to the individual varieties require exposition by definition. The definitions bring into order the chaotic mass of individuals which forms the subject of classificatory research. However, instead of operating with the definitions, the systematist employs, for the sake of brevity, names for them, thus simplifying reference. **Every name is a term for a definition.**

It follows from this that a name which *is not* a term for a definition—*i.e.* for which no definition has been given—has no standing. Naked names, with which classification has been favoured in abundance, are no valid terms ; they become so only from the time when the fact or idea is published for which they are meant to be employed as a convenient means of reference, and therefore cannot take precedence over a name which has been defined before that time. An author who publishes a name for a genus, variety, family, etc., either has some kind of definition in his head—and then he should not keep this definition a secret,—or he has not—and then he should not propose a name for something he does not know, and of which therefore he cannot be certain that it exists at all. The action of an author who publishes naked names is as indefensible as would be that of a describer who published names for the respective subspecies, for instance, of those Oriental Papilios which are as yet not known from certain islands, but which doubtless occur there, and which are certainly different from the subspecies of all other places. We appeal to secretaries of scientific societies and to the editors of scientific journals to suppress all new names which are not accompanied by some kind of definition. Systematic work should no longer adhere to the bad habits of the middle of the last century, when the Linnean method of classification, though so young in years, had already become weak as if from old age and had lost its vigour, and classifying was to a great extent more a pastime than a science. A catalogue of names like Dejean's, containing thousands of *nomina nuda*, published there for the first time, is, we hope, an impossibility in our time ; but single *nomina nuda* still at the present day appear even in works professing to be scientific.

It follows further, that, if we do not wish to jeopardise altogether the efficiency of nomenclature as a convenient means of reference and communication, and thus efface the motive which induces scientists to burden themselves with a nomenclature, it is absolutely necessary that a definition should be replaced

* We understand under *deduction* the process of reasoning by which we conclude from a general law the correctness of single cases ; under *induction* the process of reasoning by which from single cases a general law is formulated.

only by one and the same name, and that a certain name should apply only to one and the same animal **everywhere**. Whoever adheres to this principle of stability of nomenclature must concede that this end can only be attained by adhering to the first defined name for every animal or plant. No compromise is possible. Personal preferences for euphony, so-called purity of language, etc., must be sacrificed by all those who sincerely advocate stability of names ; there is no help for it.

A publication is meant to distribute knowledge acquired by the author. The publication of a new scientific fact or idea is meant to enable the reader to understand what is discovered. As even nowadays names without any attempt at exposition are considered valid by a good many systematists, it cannot be wondered at that the definitions published are not always so precise as to advance the knowledge of the reader beyond the fact that something hitherto unknown to the author is defined. We have the description, and do not know what to make of it ; we have a name, and know perhaps what it signifies philologically, but not what its meaning is in natural science. There is no excuse for unnecessarily vague definitions of varieties, species, genera, etc. ; but there is much in the method of so-called systematic work which explains the frequency of inadequate descriptions. Incompleteness is an inherent character of classificatory research ; the best definition is not complete, and may, therefore, any day become insufficient for recognising the species and variety defined, or must be modified in the case of genera and the higher classificatory categories. A character apparently not worth mentioning to-day may become very important when more allied forms are known. But then, what is the use of having descriptions at all ? They are nothing but a record sufficient for the time (or meant to be so). They do not profess to be final, though the author may aim at finality. Here, as everywhere, the advance towards completeness is gradual. As our knowledge increases, the definitions of species, genera, etc., become widened or restricted. The **definitions** change in scope, while the **name** which was valid for the original definition remains the same. This contrast between a stable nomenclature and a labile knowledge is a nomenclatorial evil and a source of much disagreement among systematists. If we tried to make the names as labile as is our knowledge of nature, the remedy would be worse than the evil. Albeit we cannot do away with the evil altogether, we are at least able to mitigate its severity by the application of a dose of common-sense.

We all know that the number of specimens on which the definitions of new species and varieties are based—it is of no consequence for our argument which classificatory category the reader designates with the word "species"—is extremely small compared with the number of individuals existing. Innumerable species have been described from single specimens. Though this specimen or these few individuals may have been abnormal, though the definition is afterwards found not to cover the entire species at all, as an original definition seldom does—unless it is so vague as to cover other species as well—the name given to the first-named individual or individuals is accepted for the vast

number of specimens which are later found to belong to the same species, be they practically identical or be they very different in appearance. Preference is given to the first name, though the species may later have been much better described under another name. Nobody with a sense of responsibility will nowadays re-name a species, variety, or genus of which he knows that it has a name, on the ground that the original definition does not apply to all the specimens of the species, or all the species of the genus, for which the original name is now employed. Everybody who agrees that for the sake of a stabile nomenclature the first name should strictly be preserved, gives to the first individual or individuals which became known to science an importance in respect to nomenclature which none of the later-discovered specimens can acquire.

Now, if a definition is not sufficiently precise to recognise by it the species or variety, there is one way of solving the riddle, accepted by all systematists, we think. If there should be somebody who objects to this means of finding out the meaning of published but insufficiently defined names, and advocates that such names should be dropped, he will doubtless retract the objection, if he comes to think of the consequences. To drop such names, though theoretically justified, is impossible, as such a procedure would give the careless worker and the ambitious amateur of the worst sort an excuse for inventing new names wholesale. The means referred to of ascertaining the meaning of an original definition is the comparison of the original specimens. If they are not preserved (or if the author has based the name on an inaccurate figure or on an insufficiently precise description of an earlier writer), the name cannot take priority over another name; it may be put down as a query synonym under some species with which the definition agrees best, or may be enumerated as *species indeterminata* at the end of the catalogue of the group. There are very few defined names of *Sphingidae* which we cannot refer with certainty to any species known to us: *Sphinx ixion* and *Sphinx belis* of Linné; *Sphinx leucophaeata* and *Chaerocampa thalassina* of Clemens; *Smerinthus decolor*, *Sphinx trojanus*, *Chaerocampa brasiliensis*, *Macroglossa tristis*, and *Oenosanda chinensis* of Schaufuss, are examples. If the originals are there and are sufficiently well preserved, we may be spared all difficulties, or we may get more deeply entangled in the meshes of nomenclatorial controversy according as we find one or more originals. Let us consider the two cases separately.

(1) If the species (or variety) was based on one individual, or, at all events, if only one individual (authentic, of course) is preserved, and there is nothing in the description which distinctly points to the definition being based on several different specimens, we are quite **certain** of what the name applies to. And that is all we require.

(2) If the species was based on several specimens, we may find that they belong to one species (or variety), or to more than one:—

(*a*) If they are actually of one species (or variety), there is again no uncertainty about the application of the name. But we must remember that to pronounce two or more individuals to be specifically the same is nothing else

but a conclusion, and that a conclusion may be erroneous. Those who have some experience in systematic work will know that every now and again it happens that the specimens which one author considered to be the same species (or variety) are proved by another to represent several. The reader will find a number of instances illustrating this experience, if he looks over the synonymy in the present work. Therefore, what appeared to be certain may become uncertain again, if there are more than one original specimen. Some authors will, indeed, accept the identification even if it is based on some such mistake, because they consider a name far too unimportant to justify a strict adherence to principles, if a change of names is involved. However, the majority of classifiers will oppose a name which is incorrectly applied. This spirit of opposition against all mistakes is very healthy. We should deplore its absence ; for we are sure, because we know instances, that he who intentionally overlooks errors in apparently irrelevant matters, will treat in the same spirit also details of fact which appear to him trivial, which may, however, be of the greatest bearing upon general questions, and, therefore, mislead altogether the generaliser who has to depend on the accuracy of the specialist.

(*b*) If it is proved that the original specimens belong to more than one species (as do, for instance, the originals of Walker's *Macroglossum sitiene*, *corythus*, *Nephele viridescens*, etc.), systematists have adopted several methods of narrowing down the conglomerate to one species. These methods are as follows :—

(b^1) First method of restriction : The name of a composite species is to be restricted to that component which is the first to which the name is afterwards applied by the same or some other author. Illustration : *Macroglossum corythus* of 1856 consists of three species $\begin{cases} \text{A}, \\ \text{B}, \\ \text{C}. \end{cases}$ Of these B is the first mentioned as *corythus* after 1856 ; *ergo*, the name of *corythus* is restricted to B.—To be certain of the result, it is necessary to know which **is** the first, and that requires a knowledge of **all** the books where the name occurs, and, moreover, a knowledge of what is meant therein by the name. These premisses may sometimes easily be got over, but they present more often difficulties which are as intricate as those which the method professes to solve.

(b^2) Second method of restriction : The name is to be restricted to that component of the composite species which remains after the other components have been subsequently separated under **new** names. Illustration : *Macroglossum corythus* $\begin{cases} \text{A}, \\ \text{B}, \\ \text{C}. \end{cases}$ As A and B are described as new in 1875, the name *corythus* remains for C.—To arrive at this result, one has to inquire into the descriptions of the new species, in order to find out whether the new names really apply to A and B ; the new species will in many cases again be found to be composite. The method, therefore, creates new difficulties in trying to remove the old ones.

(c^2) Third method of restriction: As the first and second methods are opposed to one another, differing nearly always in the results attained, we reject them both. The energy spent on the book-research which either method requires is misapplied, reminding one too much of the famous fight against windmills. Nomenclature is not part of nature; it is an auxiliary means invented by the classifier for his own convenience. What in the name of common-sense compels us, then, to turn a convenience into an inconvenience? There is a wide scope for research in nature requiring all the energies of scientists. Why, then, impose upon scientists those unnecessary labours which have only a nomenclatorial, but no scientific result? The method adopted by ourselves is at once logical and very simple, and removes all the difficulties as far as that is possible. Our method of dealing with composite species (and genera) is to narrow all cases down to the case dealt with under (1) by simply applying also here the law of priority recognised by nearly every classifier as the only means of arriving at a stable nomenclature. From the sequence of the localities under a composite species, or from the characters mentioned in the definition, or from the bibliography referred to by the author of a new species, one is able to draw up a sequence of the components of the species. If *Macroglossum corythus*, as conceived by Walker in 1856, consists of three species, A, B, C, we have:—

$$\textit{Macroglossum corythus}\begin{cases}\text{A} = \textit{M. corythus};\\ \text{B} = \textit{M. corythus};\\ \text{C} = \textit{M. corythus}.\end{cases}$$

Each of the three components is *M. corythus*, according to Walker. According to the law of priority, the same specific name cannot stand twice in the same genus, and the name occurring more than once can be valid only for the species which was first published under that name, or which stands first in the book where the name is defined for the first time. This rule being applied to the above case, it follows that the name *corythus* can stand for A only. All we have to do, therefore, is to find out the sequence of the components of a composite species. This is mostly easy, especially in the case of geographically separate forms.

In the case of composite genera the sequence is given by the names of species mentioned, there being very few genera defined without reference to one or more species. Strict adherence to the above rule makes the first species mentioned the type of the genus.

One might object that this mechanical application of a rule leaves it entirely to accident which species becomes the type of the genus, or to which particular portion of a composite species the specific name is restricted; and, further, that the author did not intend to give the first species or the first specimens respectively any such pre-eminence, and that the "type" thus fixed may be just the one to which the description applies least. We reply, firstly, that we do not know the intentions of the author, as he did not state them; and, secondly, that, if the description applies accidentally less well to the species

or specimens first in the sequence than to the others, this argument holds equally good in the case of the types fixed by any other method of restriction. We invite the reader to find out the types of such genera as *Papilio*, *Sesia*, and *Zygaena* by all three methods. A glance at the original definitions of these genera suffices to fix *priamus*, *tantalus*, and *filipendulae* as the respective types according to the third method. A study of several *families* is necessary before the types can **conscientiously** * be ascertained by the first and second methods, since the species originally included in each genus belong to different families.

In mammals and birds and several other groups of animals the second method has almost generally been adopted, for genera at least. If the systematists have there really arrived at a stable nomenclature, no change is necessary, a stable nomenclature being the main aim of the principles of nomenclature. In Lepidoptera, however, and other insects, the first and second methods, less often the third, have been followed, and that has landed us in such a muddle that there is no question of stability having been attained. This being so, we should have adopted, as a matter of course, the surest method of restriction for the sake of avoiding waste of energy, even if our method was not the logically correct one for all who agree that strict priority has to be adhered to.

If the authors of the names for varieties, species, genera, etc., had done from the beginning what we now have to do with their names ; if the authors had **restricted** every name in the way that we now are compelled to restrict it, much time would have been saved. We all agree that a specific (or varietal) name based on one specimen, and a generic name founded on one species, are as valid as names based on more material. Further, if all names were based on one individual or on one species respectively, there would be no composite species and genera ; and if the original individuals of each species and variety were preserved, scarcely any difference of opinion would arise among careful workers about the application of the names. We cannot alter what has been published ; but our contemporaries and the scientists who come after us have it in their own hands to simplify nomenclature in the way here indicated by **making all names monotypical.**

We do not know who was the first to fix a *type* (= *typus*) for the name of a species, variety, or genus. The nomenclatorial term appears already in 1816 (Dalman). The word *type* was perhaps not the best that could have been chosen, as it had already a definite meaning also in science, signifying that which is typical for a group of units. But as we frequently use in science the same word for different conceptions (claw, wing, tarsus, lip, mandibles, tail, tongue, etc.), the philological objection against the term "type" is not of much weight. However, the difference between the meaning of the word as used in ordinary language and the meaning of the nomenclatorial term has occasioned confusion, and hence led to another kind of objection.

* Some writers have simplified matters for themselves by ignoring the exotic species altogether!!

Some authors, accepting the word "type" in the ordinary sense implying that the specimens called types are typical individuals, very properly reply that these types are often aberrant specimens, and very seldom the most typical for the group of individuals to which they belong. This confusion of the verbal and the technical meaning of the word "type" misleads those authors to insist further that, there being no "types" in nature, one individual being no more a pre-eminent representative of the species (or variety) than another, the word "type" as a nomenclatorial term has no standing. It is obvious that those authors fall into a deplorable error of confounding the **names,** which are the product of scientists, with the **objects** named, which are the product of nature. Certainly **there are no types** in the nomenclatorial sense in nature, **but there are also no names.** The type is as such not at all the type of the **species,** but is the type of the arbitrary **name** given to the first specimen or specimens, and applied by common consent to all the specimens which belong to the species, of which the type-specimen is only a member, like any other individual.

Those who have the stability of nomenclature at heart, and are unwilling, when proposing a new name, to lay an avoidable burden on scientists—and who do not consider themselves infallible—should mark one individual as *type* (= *typus*) of the name, and make a clear statement to that effect when publishing the name—and **one individual only.** Every care should be taken to have such individuals preserved. There is neither justification for opposing this usage by which the systematists benefit enormously, nor for employing the purely nomenclatorial term "type" in any other nomenclatorial sense than the one here advocated.

As a name is not valid if the animal or plant has already an earlier valid name, we reject also all those names of composite species and varieties of which one of the components has an earlier valid name, and the names of composite genera and higher categories which comprise the type of an earlier validly named genus or higher category respectively. *Temnora brisaeus* of Walker (1856) has no standing, because it is a mixture of several species, of which one is Cramer's *pylas* (1779). Dalman's *Hemaris* (1816) is a synonym of *Macroglossum* (1777), because it includes the type of *Macroglossum.* And for the same reason the subfamily name *Macroglossinae* (1875) becomes a synonym of *Sesiinae* (1819). *Ambulyx* of Walker (1856) cannot stand, as it includes *Amplypterus* of Hübner (1822). In general terms :—

If *A* is based on *a*,
or on *a* and *b*, which are not cospecific, respectively not congeneric, etc.,
or on *a*, *b*, *c*, " " " " " " "
and *B* is based on *a*,
or on *b* and *a*, " " " " " " "
or on *a* and *b*, " " " " " " "
or on *c* and *a*, " " " " " " "
or on *a* and *c*, " " " " " " "
or on *b*, *a*, *c*, or *a*, *b*, *c*, or *a*, *c*, *b*, etc., " " " "
then *B* is a synonym of *A*.

This does away with some names proposed in scamped work, of which science would be well rid, especially with those names which are founded on actually the same material. Before a new name is introduced, the author should ascertain to the best of his ability that the material for which the name is meant to stand has no earlier name. This is a demand on a describer, on the fulfilment of which classifiers should rigorously insist.

In an ideal nomenclature a name should convey to the systematist the characters of the animal or its place in the system. As long as the classification is not final this is not possible, and final it will most likely never be. One step towards this goal was made by Linné himself when he established it as a rule that an animal or a plant was to be designated by a generic and a specific name. In Lepidoptera he tried to go even further by indicating, in the case of some groups, by means of a certain ending to the specific name (*-ella*, *-ana*, etc.), to which family the species belonged. But this proved to be a complete failure. The Linnean binominal system of nomenclature had the one great advantage that, when the number of forms became larger and larger, there was no serious objection to employing the same specific name in several genera. In Linné's time, when so comparatively few animals and plants were known, the generic name was indeed sufficient to tell the scientist the position of the form in the system. This is no longer the case. By far the larger number of generic names do not convey any idea to scientists, except to a few specialists who happen to know them : the family or even the order to which the genus belongs has generally to be added to make clear what is meant. So far students of natural science have adhered to the Linnean binominal system with that tenacity with which human beings generally cling to what they have become accustomed by long usage. However, a great change has taken place in one direction. When the theory of descent threw an entirely new light on the forms of animated nature, the study of variation became an all-important subject. That the species were more or less variable was long known. But now the variability assumed quite a different aspect. It was found that there were different kinds of variation. Whereas formerly the chief object of classificatory research was to separate the individuals into species, and group these in genera, and so on, now there were in addition the several kinds of varieties to be carefully studied. For this purpose a nomenclature of varieties is as necessary and as convenient a help as the Linnean binominal nomenclature is to the student of species and higher categories.

Systematists agree that the name of a species, genus, or family must be of the same form, so that one recognises by the name (or rather the formula) which classificatory category of units is meant. A family name must be different in form from a subfamily name, and a genus name from a non-generic name. The name itself must show us whether it designates a species, a genus, a variety, a family, etc. The efficiency of nomenclature would be *nil* if one could not see from the name that *Charaxes castor* designates a species, *Papilio* a genus, *Agaristidae* a family, according to common agreement, *Sphinx ocellata* × *Amorpha populi* a hybrid, *Araschnia levana* f. t. *prorsa* a seasonal form, etc. This is so

self-evident that we ask ourselves in wonder how it is possible that there are systematists who do not—should we say will not?—recognise the necessity of it. If *Fringilla coelebs* is accepted as a formula for a species, *Sphinx atlanticus* is also a designation of a species, and not of a genus or a variety or a subspecies. To speak of "species" *Sphinx ocellata* and of "subspecies" *Sphinx atlanticus* is a contradiction unworthy of science.

In former times varieties were looked upon as freaks of nature. They were to many a classifier an interesting nuisance, which often threatened to upset the balance of his well-fixed species, and were on that account more often entirely put aside than welcomed as an object for research. Esper, who went perhaps deeper into the phenomena of variation than most of his contemporary entomologists, already distinguished between ordinary varieties (Abweichungen) and abnormal individuals (Ausartungen). However, as long as the principle of evolution underlying these varieties was not recognised, there was no need to study them systematically, and to work out a system of nomenclature which would bring into order the chaos of varieties, as did Linné's binominal system the chaotic mass of species.

From Linné onwards varieties, if provided with a distinctive name, are recorded in various ways. The following names may serve as illustrations: *Papilio iris luteus; Columba oenas β. domestica; Phasianus gallus β. gallus cristatus; Phasianus colchicus* (*β.*) *Phasianus varius.* The word *varietas*, introduced by Linné as subordinate to species, meant anything deviating obviously from the normal individuals of a species. The practice of putting the term in an abbreviated form, as *variet.* or *var.*, before the varietal name does not seem to have sprung up before the beginning of the nineteenth century, and the use of the term *aberratio* (*ab.* = *aberr.*) is still younger. Not rarely the "variety" was in reality the normal form, while the "species" happened to be described from aberrant specimens. There was no strict rule for the employment of *rar.* or *ab.*; some treated well-marked varieties as *var.* and less obviously different individuals as *ab.*, the distinction between *var.* and *ab.* being merely quantitative; while others employed *ab.* for abnormal specimens occurring singly among the normal ones, and *var.* for the regularly observed varieties. There are many collectors and classifiers, representing the stagnant element in this department of our science, who look at varieties still from either of these standpoints.

Since the middle of the last century, when natural science stepped from childhood into manhood, the study of variation has gradually become more methodical, with a change in the

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and has now attained a height of which our forefathers in science did not dream.

New lines of research bring to light new series of facts; and new kinds of facts require a new terminology. It will not do to have the same nomenclatorial formula for a species as for a genus; and so it will also not

do to name all kinds of varieties in the same way. It was Standinger who first separated the varieties of Lepidoptera into two categories: geographical and non-geographical varieties. There is indeed a great difference between these two categories, as we shall see later on. Unfortunately Standinger adopted for the geographical variety the old term *varietas* (*var.*), and for the second kind the term *aberratio*, giving both terms a definite meaning which they did not originally have. He should have invented a new term at least for the geographical variety. As it was, the application of *var.* and *ab.* remained in as great a muddle as before.

While there was thus some sign that the relation of the varieties towards each other was assuming a clearer aspect, at least to some authors, a curious misunderstanding crept in, which prevented many classifiers from perceiving the true relation of the varieties towards the species. It is self-evident that two or more different-looking animals which are found not to be specifically distinct from one another belong to the same species, *i.e.* are components of this species. All the components together are **the** species. This is a truism. However, systematists became accustomed to look upon that particular component which was first described and named, and of which the name was accepted as the name for the entire species, as being **the** species, while it was, as a matter of course, only one of the components of the species. It is utterly wrong to say that the first-described form is the species and the later-described forms varieties **of it.** We know, for instance, that *Araschnia levana* and *prorsa* are the same species; neither *levana* nor *prorsa* is **the** species, but the pale spring-form *levana* and the darker summer-form *prorsa* **together** are the species, thus:—

$$\left.\begin{matrix} levana \\ prorsa \end{matrix}\right\} = \text{species.}$$

It is purely conventional, on grounds of nomenclatorial efficiency, and has nothing to do with the relation of the summer- and spring-broods towards each other, or with the causes and the origin of such horodimorphism, that the first-given name, *levana*, is applied to the species. In doing this people forgot that the name *levana*, originally standing for **part** of the species, was now employed for the **whole** as well, and that therefore the true relation between the species and its components is this:—

$$\left.\begin{matrix} \text{spring-brood } levana \\ \text{summer-brood } prorsa \end{matrix}\right\} = \text{species } levana.$$

Or, if we use the term *f. t.* (=*forma tempestatis*) for horodimorphic forms, we have as formula for the insect:—

$$Araschnia\ levana \left\{\begin{matrix} \text{f. t. } levana; \\ \text{f. t. } prorsa. \end{matrix}\right.$$

Instead of employing this formula, classifiers spoke and speak of a species *levana*, meaning the spring-form, and a variety *prorsa*, meaning the summer-form, co-ordinating the one with the other:—

Araschnia levana;
Araschnia levana var. *prorsa.*

This is wrong, as the spring-form is no more **the** species than is the summer-form.

What we have said here in regard to seasonal varieties, applies also to geographical and individual varieties. Which of the components of a species is the first-described and -named form depends in nearly every case entirely upon accident. The first-named form may be the most aberrant and the very youngest development of the species, having originated from one of the later-described compounds of the species. To call this accidentally first-named portion of a species **the** species and the later-named forms varieties of the first, is a ludicrous confusion of facts. And yet, systematic work, from mammals downwards, teems with this glaring misconception.

As nomenclature is a convenient auxiliary to classification, as it is subservient to science, and must therefore be accommodated to the latter, it should not form a hard-and-fast structure, into the compartments of which the results of classificatory research have to be squeezed somehow. The distinction between the scientific part and the accessory nomenclatorial side of classification should never be lost sight of.

The aim of scientific research is to discover and elucidate the phenomena of nature. Classification, as part of science, aims at an understanding of the connection between the individuals. To attain this object it relies on facts discovered by two lines of research : firstly, on the facts relating to the body ; and, secondly, on the facts relating to life. And here, as in all scientific research, we find the primary question underlying all investigations to be difference or no difference, because science is always comparative, consciously or unconsciously. Morphology and anatomy provide the classifier with the knowledge of the body. In a vast number of instances there is no other knowledge available than this, to build a classification upon. The corporeal facts of the morphologist and anatomist are, however, no absolutely trustworthy basis for a superstructure. For the primary units of the classifier, the individuals, are always **different** from one another to a certain extent, and therefore cannot be proved to be classificatorially **identical** by corporeal comparison alone. As in inanimate nature identity can be established by action and reaction, so also in animated nature. The observed differences and apparent identities in the bodies of the individuals have to pass the higher criticism of the knowledge of the phenomena of life. Two individuals may appear very different to the morphologist ; but the classifier, who knows from observation of the living animals that one is the offspring of the other, cannot establish any other connection between them than that of parent and offspring, however conspicuous the bodily differences may be. The differences between young and adult, male and female, parent and offspring, brothers and sisters, however prominent they are, lose all the classificatory importance which the morphologist and anatomist (and the classifier misled by him) thought they had, when biology establishes the true relationship of such individuals. On the other hand, apparently insignificant corporeal differences, which the morphologist may scarcely deem worth noticing, often turn out to be differences between

animals which are entirely independent of one another. The conclusions based upon the facts of anatomical and morphological research must always give way to the direct proofs of biology. The **significance** of corporeal characters is established by biology. Anatomy and morphology give the **quantity**, biology determines the **quality**. It is therefore obvious that the classifier should not let himself be guided in his judgment solely by a consideration of the quantity of bodily characters, but always keep in mind the higher criticism of quality. If he does this, he will not easily fall into the error of treating two groups of individuals as being of the same classificatory category (variety, species, genus, etc.), if biological considerations are against it. If the classifier had no other guide than corporeal similarities and differences, the classification would merely be an artificial arrangement, without regard to the true connection between the animals classified. Such a classification, perhaps very useful for the mere collector, might be likened to an arrangement of minerals according to their external features, without any regard to their chemical composition.

Although there are no biological data available of most animals, of which we know nothing but what the dead bodies or portions of them (embryo to adult) tell us, the scientific classifier has nevertheless another guide. This guide is the principle of judging from analogy (the word used in the logical sense). We give two illustrations. If in a certain country the spring- and summer-broods of a certain group of species have been proved to be different in all the species examined, we may safely conclude that they differ also in those species of the group which have not yet been examined. Therefore, forms of that group of which it is only known that they differ in the same way as the horodimorphic forms of the better-known species must also be treated as seasonal varieties, and not as distinct species. As we have found that the genital armature, though individually variable, does not exhibit any seasonal differences in those species of Lepidoptera of which forms proved to be seasonal have been examined by us, we are bound to conclude that Lepidoptera which do constantly show differences in those structures are not seasonal forms of one species. The premiss is the better established, and hence the conclusion is the more likely to be correct, the more species have been examined. This deductive reasoning, though logically exact, will never give us certainty. For the animals as we know them are the product of evolution; the result of evolution is dependent on the nature of the animal and of the evolving extraneous factors; these extraneous factors being independent of the animal, their combination with the internal factors—which combination determines the line of development—depends on accident; results determined by accident cannot be deduced from an *a priori* law. That means, we do not *a priori* know that what holds good in all the cases examined is true also in every case not yet examined. Nearly all the so-called "laws" in biology are nothing but more or less well-formulated rules of probability admitting of exceptions. A rule may apply to every individual case within a certain group of animals; but the further away we go from that group, the greater becomes the chance of exceptions turning

up. It is hasty to generalise from a limited group of animals, though biologists are nowadays in the habit of doing so. Every group first requires independent investigation before a rule found to be true in another group can be pronounced to be true also in the one under consideration. The "laws" of development have **all** a premiss: they are true only under certain conditions. The scientist must, therefore, always remain aware that the unexpected may happen, and individual cases turn out to be exceptions. For instance, what the classifier considered to be a generalised character may turn out to be a specialisation, and what is a specific difference in one group may only be seasonal in another. Since the classifier is in the same position as the commentator of a book which is written in a language only imperfectly known to him, and from which many words and whole pages are missing, there is necessarily a certain amount of assumption in classificatory work which makes the results proportionately unstable. However, the degree of instability can be lessened to a great extent. Just as we know *a priori* that a certain character which appears generation after generation in the larger number of individuals of a species will finally be present in all (if the conditions of life remain the same), so the probability of the correctness of a conclusion in classification will become certainty, if all the details of the animals and all the facts of their biology render it probable that the conclusion is correct.

In order to approach this certainty the classifier has to give his conclusions the widest possible basis. The results of anatomy and morphology must be checked off by biology, and the conclusions derived from one organ by the conclusions based on every other part of the body. If one organ contradicts the other, there is a mistake either in observation or in interpretation. The more such mistakes are discovered and corrected, the safer the superstructure of conclusions will be. Grouping the animals according to the apparent development of one organ leads to an artificial arrangement; grouping them in accordance with all organs checked off by biology results in a final classification. However, finality, even if the classification is restricted to a small group of beings, entails such an enormous expenditure of energy that it can be approached only gradually in the course of time by continued co-operation between the various lines of research.

All classification begins with the discrimination between individuals. Everybody distinguishes between the specimens he observes around him and brings them into groups, thus setting up a rough kind of classification. Experience shows which individuals stand in the possibly closest blood-relationship—that of parent and offspring, and of brothers and sisters. The classifier starting with this experience, which can be corroborated over and over again, has therefore as foundation for classification a solid fact which will remain firm when a flimsy superstructure that a wild fancy may think fit to erect is blown away. Observation of the individuals so closely connected as parents and offspring teaches us that there is always a certain amount of corporeal difference between them, every individual having an individuality. We notice this variability in all organs

when studying them closely. There is no constancy. How far the variability extends is a primary subject of investigation. Lepidoptera are the most convenient group for the study of variation, as they can be comparatively easily reared and experimented upon. Variability may be fairly equal in all organs, or may be excessive in one and slight in others; variability of one certain organ may always be accompanied (within one group of animals) by variability in certain other organs, or the variability may be quite independent. Variability (= state of being different) is to be accounted for by two kinds of variation (= process of becoming different): firstly, *individual* variation, pertaining to brothers and sisters; and, secondly, *generatory* variation, pertaining to parent and offspring.

Individual variation is *normally* such that there is a gradation from one extreme to the other, the number of individuals becoming, however, smaller towards the ends: *monomorphism*, respectively—*chromatism*. Or the individuals which are all the offspring of the same parents fall into two or more groups, which may or may not be connected by intergradations: *di-* or *polymorphism*, respectively—*chromatism*. In every case there appear occasionally specimens which stand outside the ordinary range of variation. Such *aberrations* are generally aberrant in one organ only, and otherwise quite normal. Aberrations should not be confounded with monstrosities, in which the deviation from the normal is due to injury of the early stages. The dimorphism of commonest occurrence is sexual, the purely sexual characters being nearly everywhere in sexually separate animals accompanied by differences in size, colour, and some kind of structure. Marked dimorphism in both sexes is comparatively rare. But where such di- or polymorphism exists, and where the similar individuals of both sexes are referred to under one name, it must not be implied that the similar specimens are biological entities. They constitute like aberrant individuals a morphological or anatomical unit named in contradistinction to the other individuals. A black ♂ of *Papilio machaon* is not more nearly related to a black ♀ than to its own normally coloured brothers and sisters, and the brown ♂♂ of *Mimas tiliae* are as much the ♂♂ of the green ♀♀ as of the brown ones, in spite of corporeal similarities and dissimilarities, and in spite of similarly coloured specimens bearing the same name in classification. In most groups of Lepidoptera the variability of the *males* is inferior to that of the other sex, there being numerous species in which the *male* is monomorphic, while the *female* is polymorphic. In such cases the females are generally protectively coloured or otherwise adapted in several directions, and may occasionally become monomorphic again or more constant than the males, in consequence of the best-adapted form becoming prevalent and finally appearing alone. The habit of naming varieties has been in vogue among entomologists and conchologists more than among any other systematists on account of the great variability of insects and shells; and as the student of variation requires names for the sake of brevity of reference, there is nothing to be said against the habit. But since every individual deviates in some organ from the mean, there is some danger of the naming turning out indiscriminate. Fortunately, Lepidopterists have so

far confined themselves to ardent baptism of individual varieties showing some distinction only in colour, pattern, or shape. There is, of course, no reason for such restriction. There is just as much justification in Lepidoptera as there is in beetles for naming structural varieties. If it is not objectionable to baptise sculpture-varieties of *Carabus*, there can also be no objection against providing with a name, for instance, the numerous individuals of *Chalcosiidae* which are different in neuration. However, it is our opinion that the naming of individual varieties should not go further than is necessary, and that only the student of variation can decide how far it is necessary.

Conspicuous individual variability is observed among *Sphingidae* both in the larvae and the adults, the caterpillars of *Macroglossum* and *Cephonodes* and the imagines of some *Ambulicinae* being very variable in colour.

The differences between parent and offspring are no less marked in many instances than those of the offspring *inter se*. The generations as they follow one another are either practically the same, or there is a cycle of more or less different generations. In Lepidoptera the cycle is generally restricted to two or three broods. As these coincide in time of appearance with the seasons as a rule, this particular kind of "*generatory*" variation is called *seasonal*. Though as a matter of course the individuals of each separate brood are a biological entity varying individually in the way explained above, there is nowadays a great inclination amongst systematists as well as biologists to confound seasonal with individual variation. If two different specimens are offspring of the same female, they are surely not seasonal varieties. At the bottom of the confusion lies the assumption that, since seasonal variation depends on meteorological differences of the seasons, all differences are caused to appear by such factors. This assumption is certainly incorrect, and therefore the indiscriminate treatment of different-looking specimens as seasonal quite misleading. Everybody may draw conclusions as he pleases, but the facts must be represented as they are; they must not be tampered with. Seasonal variation is observed in several instances among *Sphingidae*. The most remarkable cases are found in *Haemorrhagia* and *Hyloicus*. Though we know that generatory variation is often structural in insects (*Aphidae*, *Physopoda*, etc.), we were nevertheless surprised to find a structural difference in the claw-segments of the two forms of *Hyloicus perelegans*, which forms we presume will turn out to be seasonal.

Having studied the differences between the individuals proved by rearing to be parents and offspring, the student will be able to select from the individuals at large those which a comparison of their bodies convinces him to be so nearly identical with the specimens reared that they might very well be brothers and sisters of them. But knowing that corporeal similarity is no absolute proof of biological identity, he will prudently test his conclusion—perhaps gather some female moths which come to his lamp and which seem to him identical to all intents and purposes, get eggs from them, and rear the larvae. To his astonishment he finds that the apparently identical females have

produced two very different kinds of caterpillars, from which he obtains in the course of time a series of imagines again very much alike, but presenting now to his searching eye and suspicious mind some slight differences. Continued experiment with the two insects proves to him that he has to do, not with a dimorphic larva, but with two entirely independent beings, which fly together and feed as larvae on the same plant, and which are scarcely distinguishable as adults, and are nevertheless perfectly kept apart in nature. He realises that there is a gap between these two kinds of insects which is utterly different from the gap between the varieties which stand in the relation of parents and offspring; that there is an effective barrier which lies in the nature of the specimens themselves, separating the two sets of individuals completely, though there is no extraneous barrier between them. And by studying further the life around himself, the student will perceive that the animated world is composed of a multitude of such sets of specimens, of such entities, all separated by that same kind of barrier. The knowledge of the existence of this barrier is essential for the classifier. What the barrier is the student cannot know with certainty. The corporeal differences observed in the individuals are not the barrier, but are only accessory to it.

Passing now into a neighbouring country, the scientist will find practically the same composition of the fauna, though some old friends may be missing and some strangers may meet his eye. A good many of the entities will indeed be identical with what he knew before, but others appear in an altered garb. In one the range of variation has remained the same; but the individuals which were in the minority in the first place are here in a majority, the mean of the variability having changed. Another entity, which was known to him as being monomorphic, is dimorphic in the new locality. A third, which was seasonally variable there, does not exhibit seasonal variability here. Among the specimens of a fourth entity there appear individuals different from what the student had hitherto seen, the range of variation having become shifted or widened. In others, again, he finds the proportion of such different individuals to be larger and larger, until the student comes to entities of which all specimens exhibit some distinction from the individuals of the former country. They are the same entities, but with a difference.

Now, in which relation to each other stand such geographically separated entities? The two extreme cases are these:—

(1) The geographically separated entities are, each taken as a whole, identical, with the same range of variation and the same mean of variability.

(2) The geographically separated entities are different from one another in all individuals.

Between these two extreme cases there are all intergradations. The difference may be found only in a very small proportion of the specimens, or only in one sex, or in the greater number of individuals, or in nearly all, or in all. The difference may be structural, or chromatic, or both; it may be

conspicuous or scarcely perceptible; the gap between two geographically separate entities may be small, or large, and it may be completely bridged over by individuals from other countries. A careful observer of any group of sexually separate animals will know many instances referable to the various cases alluded to. We will call such geographically separate animals which are different, *geographical representatives*.

In order to see clearly what the difference means, it is necessary to know the meaning of identity in geographically separate individuals. If two geographically separated specimens prove on comparison to be identical, or are considered identical, the student has to conclude that they are not separated by that barrier which we have above characterised as effectively keeping the entities of the same country (= synoecic entities) apart. As each of the two individuals is a portion of an entity in its native country, these two respective entities are also not separated by that barrier. That means, the two entities together are only one single entity separated from all the others by the above barrier. We cannot help adding, that it appears very strange to us to see some individuals pronounced identical, and to find them, nevertheless, treated by the same author as belonging to two "species."*

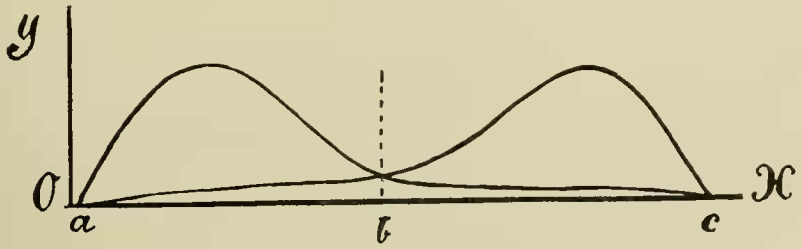
It is clear, from what we have just said, that geographically separate animals which are identical in some of the individuals, or, in other words, of which the range of variation overlaps (A^1 varying from 1 to 5, A^2 from 4 to 12, A^3 from 7 to 19, A^4 from 18 to 21, etc.), are one biological entity; that is to say, the geographically separate different specimens are the product of geographical variation of the same animal.

It is a difficult task to find out the limits of variation. The material which comes into the hands of the student being insignificant compared with the number of individuals at large, it depends upon chance that the extreme individuals become known. Experiments, especially with Lepidoptera, have proved that the range of variation can be increased artificially. That is to say, the capability to vary is greater than we generally observe it to be in the material collected, and therefore we must expect that the range of variation is in many cases actually more extended than we see it, and that, consequently, very often also those geographically separated different animals overlap in characters which differ constantly in the specimens contained in collections. If the number of individuals is small (we know frequently only one or a few specimens, often only one sex), it is the merest assumption to say that all the specimens of the respective locality are different from all the individuals of a certain other locality. And an author who makes such a statement is no less hasty or superficial in his judgment than the one who waves the distinctions aside as being of no importance. However, if there is any reason for expecting the characters to overlap, it follows from what we said before, that the individuals from the two places together belong to one entity. The accompanying diagram (Fig. 1) demonstrates perhaps more clearly the correctness of

* See *Nov. Zool. IX.* p. 459 462 (1902).

our argument than any words. The diagram illustrates an extreme hypothetical case. The curves A^1 and A^2 represent the variation* of two geographical representatives. The extent of variation, *a c*, is the same in both representatives, but the means are different. The small number of specimens, *a b*, belonging to A^2 are identical with the majority of the individuals of A^1, while the small proportion *b c* of the specimens of A^1 are the same as the majority of A^2. It is obvious that there is little chance of the student getting any of the specimens *a b* of A^2 and *b c* of A^1, if he has not a really large material at disposal. To him A^1 and A^2 would appear to be separated by a gap; they would appear to be constantly different, though they are, each taken as a whole, morphologically identical.

Two sexually or otherwise di- and polymorphic animals do not differ in all specimens in the same way; one sex or one set of individuals may be distinguishable by colour, the other by shape; one form may be paler, another darker, than the respective forms of the animal with which they are compared. To find out the differences between two geographical representatives which are



A^1 FIG. 1. A^2

di- or polymorphic, it is necessary to compare the corresponding forms with one another, just as one has to compare sex with sex, larva with larva of the same stage, pupa with pupa. There are also monomorphic geographical representatives which differ from one another in a similar way, some individuals differing in shape, others in colour, others again in pattern or in structure. The difference between the two representatives is also often constituted by the *ensemble* of the characters in each individual.

Such cases lead over to those in which the geographical representatives are completely separated by a gap in their morphology, either in one or in several organs. If A^1, A^2, A^3, A^4, etc., are the representatives of one certain type of animal, inhabiting, for instance, each one particular island, and B^1, B^2, B^3, B^4, etc., those of another type of animal found on the same islands respectively, there is a corporeal gap between A^1 and A^2, etc., and between B^1 and B^2, etc., which do not live together, as well as between A^1 and B^1, A^2 and B^2, etc., which live together. And now the question arises, Are the gaps between the various A's

* The ordinate gives the number of individuals, the abscissa the degree of difference.

and those between the various B's biologically equal to the gaps between the synoecic A's and B's? Does the barrier which we know to exist between the synoecic A^1 and B^1, which occur together, exist also between A^1 and A^2, which are geographically separate? There are many scientists who say Yes, and many who say No. Let us consider first the arguments advanced for the correctness of an affirmative answer.

(1) The geographical representatives A^1 and A^2 are constantly different; *ergo*, there is a constant barrier between them, as in the case of A^1 and B^1.—Firstly, this is begging the question. Secondly, we have seen above (p. xxxiii) that corporeal differences as such do not constitute the barrier existing between A^1 and B^1. Thirdly, in a vast number of cases it is mere guess-work to maintain that A^1 and A^2 are constantly different; all we know of them is that they are different under the special conditions under which they are living, similarly as seasonal varieties may be constantly different if the conditions are constant. If the constancy of the special conditions falls, the constancy of the corporeal difference between A^1 and A^2 will certainly or perhaps—we cannot tell *a priori* which is correct—also break down.

(2) A^1 and A^2 are geographically isolated. They form therefore separate biological entities which do not interbreed and fuse.—We reply, firstly, that this is again a restatement of the question; secondly, that, as there are numerous cases of identical individuals (as far as there is identity in individuals) being geographically separated from one another, geographical isolation as such is no criterion whatever; and, thirdly, that the facts of A^1 and A^2 being geographically separate, and A^1 and B^1 living together, constitute certainly not an agreement, but, on the contrary, a difference in the relation between A^1 and A^2, and A^1 and B^1, respectively.

Our arguments for geographical representatives not having *a priori* the same biological standing as the synoecic animals which are separated by the barrier before characterised (p. xxxiii), are as follows:—

(1) The geographically separated and morphologically distinguishable representatives A^1, A^2, A^3, etc., are morphologically and anatomically more similar to one another than to B^1, B^2, B^3, etc. The A's are modifications of one and the same type, the B's of another, the C's of a third, etc., and each type as a whole stands in contradistinction to the other. This is a statement of fact, not of opinion. Now, since the existing modifications are the result of evolution from the ancestral types, it follows that phylogenetically A^1, A^2, A^3, etc., stand in closer relation towards each other than do the synoecic animals A^1, B^1, C^1, D^1, etc., the A's forming one branch, the B's another, the C's a third, etc., of the phylogenetic tree. This difference in the degree of blood-relationship between the geographical representatives (= geographically separate components) of one type and between synoecic types is very conspicuous in all classes of animals where adequate material has been conscientiously studied. From the point of view of a morphologist alone, all the animals which are clearly geographical representatives of one

another have a different standing in classification from the non-geographical entities.

(2) If a small proportion of the specimens of A^1 and A^2 are the same, and A^1 and A^2 (or one of them) are brought under conditions which favour the appearance of the characters of this small proportion in each case, bionomics teach us that A^1 and A^2 will in the course of time become more and more similar, overlap wider and wider, and become finally identical. That is to say, A^1 and A^2 cannot live together without fusion. However, if A^1 and A^2, which differ, say, in 99·9 per cent. of the individuals, cannot exist together as separate entities, A^2 and A^3, which are connected by intergradation in the intermediate countries, or A^3 and A^4, of which the ranges of variation are contiguous, or A^4 and A^5, which are separated by a small gap, have no chance of remaining separate entities, if by accident brought under the same conditions of life. As there is a gradation in the morphological difference between geographical representatives (see Fig. 2, in which the curves D^1, D^2, D^3, etc., are

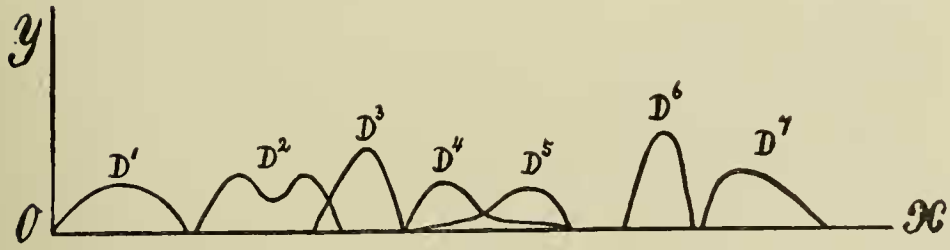


Fig. 2.

the geographical representatives), some being slightly, others more distinctly, and others again widely different, it is obvious that the chance of the representatives **not** overlapping in characters, under those altered conditions of life above referred to, becomes larger and larger, the wider the morphological gap is between them. From this point of view it depends, therefore, entirely upon the characters of the geographical representatives whether these can exist together or not, *i.e.* whether there is a similar gap between A^1 and A^2 to that between A^1 and B^1. In other words, considering the gradation in the morphological differences, there are morphologically different geographical representatives which can certainly not exist together without fusing to one entity, and there are others which may be so far settled in their characters that a fusion will not take place.

From what we have said it follows that it is wrong to treat all geographical corporeally different forms indiscriminately as being separated by that same barrier which prevents synoecic animals from fusing. As science does not knowingly perpetuate errors, the contention which we have demonstrated to be erroneous should be abandoned by those who claim their

work to be wholly scientific; and nomenclature, the language of classification, should therefore have a different formula for the two different conceptions, if classification is meant to be precise. And the language recording in formulas the results of classification must be precise, because science has specially invented the formulas to prevent confusion arising.

However, before going further, let us consider another side of the question. It might be argued, with some degree of justification, that nomenclature is a practical invention for the convenience of the classifier (and those who make use of classification), and, as we said above, must not be turned into an inconvenience. Now, if the classifier is compelled to distinguish between geographically isolated forms which are equal to distinct synoecic animals, and such which are not, and again between geographical and non-geographical corporeally distinct animals, an amount of work is thrown on him which he could easily avoid by treating all definable forms in the same way, as being all co-ordinate. Those of our readers who follow classificatory literature* are aware that we are not stating an imaginary case, with the object—as so often happens in science and elsewhere—of demolishing an opinion which nobody entertains. The procedure above advocated is certainly a great simplification of work. But we may be allowed to state in response that a far greater simplification can be attained by putting all geographical modifications of the same type down as identical, nomenclatorially and classificatorially. If the splitter who indiscriminately calls everything definable a "species" claims the right to live, ourselves as impartial onlookers must concede the same right to the lumper who treats everything not conspicuously different as being identical. These two opponents are almost hopelessly at loggerheads. We say almost; for we perceive some glimmer of hope of a good ending in the fact that, as in the struggle between two nations the victor becomes generally influenced by those details of civilisation in which the vanquished excels, both the lumper and splitter will profit from one another in the course of time, both remaining victorious in the struggle till the end, the one knocking over what the other considers distinct, and the other separating again what the former has put together as the same. Do not let it be truly *ad infinitum*. We sympathise with both; for we believe that we understand the cause of the struggle and the reason for its unreasonable continuance. When Linné invented his nomenclature (binominal, except most Lepidoptera) for his classification, he started with the conception that the animated world was composed of a great number of forms which, though variable to a certain—mostly small—extent, were fixed entities. These entities he defined as *species*, and designated each with a name. The introduction of a precise discrimination (or what was meant to be precise) between the species, and their fixation in classification by a name, gave a great impulse to collecting and studying the forms of animated creation. During the last century the material increased at such a rate that the number of *species* known to Linné became soon insignificant as compared with what

* See, for instance, *Verh. V. Intern. Zool. Congress* p. 910 (1902).

more extensive collecting brought to light.* Among the new materials the systematist found a multitude of forms connecting by all kinds of intermediate grades a great number of hitherto well-separated "species." In dealing with these intermediates systematists adopted three methods.

The one class of describers, disregarding variability, thought to carry out in the correct way Linné's method of classification and nomenclature by applying Linné's term "species" to every group of individuals which they found to be definable. As every individual differs to some extent from the other, every specimen was naturally a trap for these authors, who continually considered individual differences to be specific, and hence described an army of "species" which had no standing at all.

Another class of systematists, noticing the links connecting what otherwise appeared to be distinct "species," were inclined to regard everything similar as being the same. They forgot that the first object of the describer is to distinguish between what is distinguishable, and they were still further carried away by the reaction against the indiscriminate creation of species which necessarily set in.

There was, therefore, a kind of excuse for the one as well as for the other class of systematists; the one student erring in being too zealous in applying throughout what he thought to be the generally adopted Linnean method of dealing with the animated world, and the other falling into mistakes by over-zealously correcting the errors (or what appeared to him as such) of the former.

The right path lies, as it mostly does, in the middle between those followed by the extremists. A third class of students, keeping their mind unbiassed, were led along this middle path by their own power of discrimination. They learnt from the investigation of the mass of material in museums and private collections, and from observations on living specimens, that neither everything similar is identical, nor everything dissimilar is specifically distinct.

It is the lack of discrimination which prevents either extremist from finding the right path. However, the work of the splitter has a great advantage over that of the lumper. The differences which he points out between the

* The numbers of species described by Linné in *Syst. Nat.* ed. x. 1758 are as follows:—

Mammalia		184
Aves		554
Amphibia		218
Pisces		378
Insecta	Coleoptera	665
	Hemiptera	197
	Lepidoptera	542
	Neuroptera	60
	Hymenoptera	229
	Diptera	188
	Aptera	229
Vermes		927
	Total	4371

animals are there. In the statements of fact he is correct; but he errs in the interpretation of these differences. His sight is keen, his reasoning—less so. The lumper, on the other hand, does not perceive the differences, or he perceives them only in a hazy way; he puts them down as insignificant and passes on, halting only if there is a conspicuous quantity of difference which impresses itself on his mind. His eye and reasoning are on the same level, and his work is generally scamped. As he depends in his judgment on the conspicuousness of the characters, he naturally falls constantly into the error of treating as the same what differs in non-contrasting colours or in vaguely perceived structures, and as distinct what differs in contrasting colours, in shape, size, and other easily noticed characters. It may appear ludicrous to the non-initiated, but it is nevertheless true, that in one and the same group of animals—for instance, Lepidoptera—the same kind of difference is considered by the same authors as being of no significance in the case of small forms, where it requires careful research to find the distinctions (*Epiplemidae*, *Geometridae*, *Thyrididae*, etc.); while it is treated as being specific in the case of large ones, where even a dull eye cannot fail to perceive the difference (*Papilio* and other butterflies). Sombre-coloured animals (some *Sphingidae*, *Noctuidae*), small forms (*Epiplemidae*), and such with a uniform pattern (*Micronia*, for instance), are generally great stumbling-blocks for the lumper. The author who treats everything definable as distinct has at least method in his errors; the author who depends entirely on what appears to him to be a sufficient quantity of difference is quite arbitrary in his judgment.

The errors of an author arising from physical shortcomings, lack of training, and a certain flightiness in reasoning may leniently be passed over, if the mistakes are not persisted in when they have clearly been pointed out. However, the direct misstatements as to variation and distribution, which the lumper is more liable to make than the splitter, are scarcely pardonable. If it is the object of the systematist to elucidate facts, and not to conceal them or to misstate them so as to mislead, it is wrong for an author to suppress distinctions which he has noticed; to refer to differences which are geographical, as if they were individual; to consider characters as seasonal which he knows not to be seasonal; to pronounce a form constant, if he knows only one or a few specimens; to treat another as being individually variable, though he knows only single individuals from different countries. In short, it is wrong—and may become objectionable, because bordering on charlatanism, if the misrepresentation is made deliberately—to represent anything to be what it is known not to be, or what on a little consideration it would have been known not to be. Neither the author who considers every form definable as being specifically distinct, nor his opponent who treats as identical everything of which the distinguishing characters do not appear to him to be conspicuous enough, fulfils one of the primary demands on the conscientious classifier—namely, to discriminate carefully between the differences presented by the various forms of animals he has to deal with, instead of lumping and separating indiscriminately.

We are aware that a good many systematists, both among amateurs and professionals, have no higher object than naming and arranging the material in their collections, and maybe issuing books to enable others also to name and arrange the specimens, the knowledge aimed at being a knowledge of some distinguishing characters, and especially the name of the "species." However, the knowledge of the alphabet does not carry with it the knowledge of the language, and he who knows the words and speaks a language is not yet a philologist. So there is also in classification a higher object to be attained than merely describing, baptising, and arranging in some arbitrary order the forms of animated nature. This higher object is to understand the phylogenetic relation between the forms, and on this understanding the scientific classifier bases his system.

In order to comprehend the connection between the forms, it is necessary to know what it is that separates them. It was the one kind of difference to which we have referred before, separating the animals which exist side by side, the one effective barrier consisting of differences in the organisation of the animals themselves, which was the keynote to the Linnean Reformation of Natural Science and to the Darwinian Revolution. The individuals within the barrier form an entity which has an existence independent of all the other entities. Each entity was in the Linnean classification understood to be a special creation, and the effective barrier to be intended to prevent fusion of the entities. **This** was the conception to which Linné applied the term **species**. And **this** was again the conception which formed the subject of Darwin's *Origin of Species*. The great mystery which the theory of descent sought to explain was the fact of the co-existence of such innumerable independent species, all separated by that gap which we know to keep the species apart. How did this **specific** barrier come into existence, if not erected by special creation? That is the fundamental question which is before scientists. The question is not solved by looking it straight in the face and then shelving it by applying the term "species" to something else than what it originally meant. No friend of true research should let pass unchallenged what so many classifiers nowadays try to do—namely, to substitute for true species the geographical form. We know that a **specific** barrier exists between synoecic animals; we know that there is a morphological distinction between geographical representatives. Can the one barrier which we **know** to be specific honestly be replaced by the geographical difference which at the highest may be **assumed** to be specific, and of which we know that it is **not** always specific? We shall oppose any such attempt at underhand shifting of the meaning of the term "species," which would misguide the public and prevent the student himself from seeing clearly the question at issue.

If the specific barrier is the result of the evolution of the organic world by natural causes; if, further, the multitude of species is the outcome of the divergent development of species into a greater number of species,—then we have to search for the rudiment (= beginning) of the specific barrier among

differences found **within** a species between the various component varieties and individuals. Therefore it is necessary, in order to understand the origin of the specific barrier, to study the varietal differences, and find out among which varieties there is a rudimentary specific barrier, and hence which varieties are rudimentary (= incipient) species. It has been shown by one of us* (and therefore we do not again fully enter into the same question) that the development of gamogenetic species into two or several species is not possible without an effective **extraneous** barrier between the varieties, which barrier prevents the fusion of the varieties, as does the specific barrier the fusion of the species, and, further, that this extraneous barrier is provided by geographical separation. Isolation of one or more mutating factors is the cause of the portion of a species subjected to them becoming different from the other components which stand under other influences. All our researches confirm this conclusion based on the facts of variation, and all attempts to demonstrate the possibility of the separation of a species into several without some kind of local isolation are fallacious in reasoning. *Geographical variation leads to a multiplication of the species; non-geographical variation at the highest to polymorphism.* Geographical variation is, therefore, of another kind than non-geographical variation, and therefore geographical varieties have a different standing in the evolution of the organic world from the individual and generatory varieties.

Geographical varieties as incipient species are the next classificatory category below species, just as subfamily is a degree lower than family, and no better term could have been invented for them than *subspecies*. With **subspecies** we designate, therefore, nothing else but the **geographically separated different** components of one and the same type, which components represent together a **species.** The criterion of a subspecies is not a certain amount of difference, but bodily difference **and** geographical separation. Synoecic varieties—*i.e.* varieties from the same locality—are never subspecies. We have to emphasise this distinction, as many authors constantly confound subspecies with non-geographical varieties. There are comparatively very few species which do not vary geographically. It was an ardent opponent of Darwin—Wiegand—who put forward as an argument against the theory of evolution that geographical variation was a *conditio sine qua non* for the correctness of the theory of descent, and that there was no such general basis for evolution. Systematists have proved by their minute research that geographical variation is the rule and not the exception, and they may be justly proud of this result of their untiring labours. Curiously enough, non-systematists do not generally seem to be aware of this result, nor to fully comprehend its bearing on the theory of descent.

A species which has not developed into subspecies (= geographical varieties = geographical races or forms) may be individually or seasonally di- or polymorphic, and similarly the individuals of a subspecies may all fall into seasonal and these into individual varieties. As the species of a genus are co-ordinate

* See "Mechanical Selection" in *Nov. Zool.* iii. p. 426 (1896); "Reproductive Divergence, etc., in *Natural Science* xii. p. 45 (1898).

with one another and subordinate to the genus, so are the subspecies co-ordinate with one another and subordinate to the species of which they are the components. Since Linné applied the term *varietas* to the forms which are not specifically different, we do not see any reason against the use of this very convenient word in the same sense for **all** the components of a species which differ from one another. We understand, therefore, under *variety* not a particular category of the components of a species, but employ the term for all the different members of a species indiscriminately. The different categories of varieties must receive special terms in a precise classification, and special formulae must be employed for them in a precise nomenclature.

We distinguish three categories of varieties, namely :—

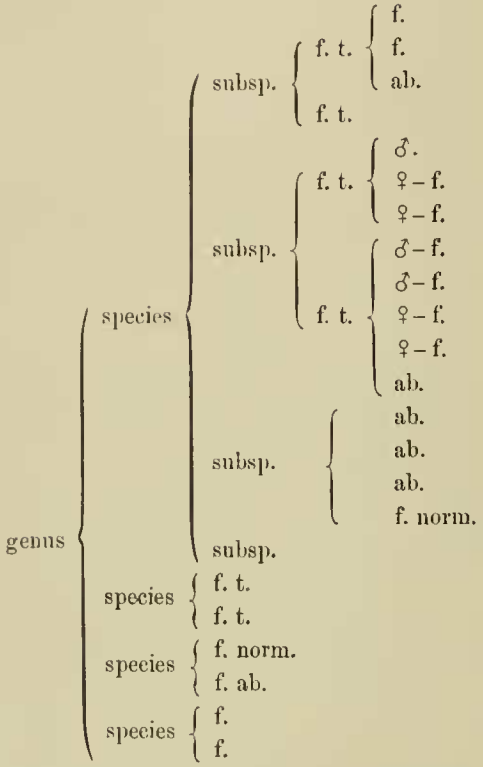
I. *Individual variety.*—The following terms are employed by us :
(1) *ab.* = *aberratio* for individuals which stand outside the normal range of variation.
(2) *f.* = *forma* in the case of di- and polymorphism. If a form occurs rarely, it may be termed *f. ab.*, in contradistinction to *f. norm.*
(3) ♀-*f.* or ♂-*f.*, if the respective form belongs to one sex only.
(4) *f. loc.* = *forma alicuius loci*, if, in the case of polymorphism, a form is restricted to one portion of the range of the respective variety or species.

II. *Generatory variety.*—This variety is seasonal in Lepidoptera, and is designated as
(5) *f. t.* = *forma tempestatis.*

III. *Geographical variety* or *subspecies.*—This is the highest category of varieties. As the term *varietas* includes also other varieties, it cannot be employed as such for the geographical variety except in a precise nomenclature; either a specifying attribute must be added (*var. geogr.*), or an abbreviation of another term chosen (*subsp.*). But we do not see that it is at all necessary to put any such abbreviation of a term before the subspecific name. We can do without the encumbrance of the abbreviation—what we can do without is unnecessary : and what is an unnecessary encumbrance in nomenclature, common-sense compels us to drop—by
(6) Simply mutually agreeing that a subspecies is designated by its name added to that of the species without any abbreviation before the subspecific name. This means **simplification of nomenclature, nothing else.**

The following diagram illustrates the nomenclatorial relation towards each

other of the various categories of classificatory units from the individual variety upwards to the genus:—



There seems to us to be some confusion existing in the minds of some systematists with regard to the degree of phylogenetic relationship of the animals classified and the nomenclatorial position of the units towards each other.

Although it is the highest object of the researches of the systematist to elucidate the phylogenetic connection between the classificatory units from the individuals upwards to the family, order, etc., the linear arrangement of the units in the system gives but a very scanty elucidation of their evolution. If a genus is a development from another, it may be put behind the older one; but this method at once breaks down if there are several genera derived from one, especially if one of the derivatives has again given rise to a series of genera. And nomenclatorially the classifier can do even less. In nomenclature all the units of one category are co-ordinate units; all the species, all the subspecies, all the genera, etc., are respectively co-ordinate with one another. The classifier cannot make any nomenclatorial difference whatever between phylogenetically younger and older genera, between the parent- and daughter-species, between the generalised and specialised subspecies. We have the same nomenclatorial formula for every genus (*Papilio, Fringilla*), for every species (*Papilio priamus*

Fringilla coelebs), for every subspecies (*Papilio priamus poseidon*, *Papilio priamus priamus*, *Papilio priamus coelestis*). If the classifier wishes to represent the probable phylogenetic origin of the units which stand co-ordinated in his system and nomenclature, he has to take recourse to the figurative tree, or must give a kind of pedigree, as we have done in the present work. *Fringilla coelebs* does not mean that *coelebs* is a derivation from *Fringilla*, but that it forms part of the genus *Fringilla* ; and *Papilio priamus poseidon* must not be interpreted as signifying that *poseidon* is derived from *priamus*, but that it is one of the several components which together form the species *Papilio priamus*. This confusion of ideas has been occasioned by the unfortunate habit, which many classifiers cannot shake off, of regarding the first-described component as the typical form of a species, as the "Stammart," * as the phylogenitically oldest portion of the species, or in the case of a genus as the phylogenetically oldest species of the genus, while it is merely the accidentally first-baptised form. Is the distinction between what is **phylogenetically** and what is **nomenclatorially** the oldest really difficult to perceive and to comprehend?

The classification of the lower categories from individual variety to species is in a different position to that of the higher categories (from genus upwards). While the species and varieties are realities which can be tested by observation of the live specimens and by experiment, there is no such test possible in the case of genera, tribes, families, etc. These higher categories are definable groups of allied species. The criterion of their being realities, or, as one is used to say, of their being natural, is threefold :—

(1) The group must be definable—*i.e.* must not so intergrade with another that there is no line of division, or that the line of division is arbitrary.

(2) The contents of each group must be homogeneous. Elements of different origin, though perhaps similar in consequence of convergent development, must not be brought together.

(3) Each higher category must have a separate definition based on other characters than those referred to in the definitions of the respective lower categories. The characters which make an animal specifically distinct do not make it also generically distinct, nor can the same character upon which a genus is based be employed to characterise a tribe or a family.

To define genera and higher units is not always an easy matter. In order to render a definition precise, a close study is necessary of the forms which come under the unit defined, as well as of the forms of the allied units. The difficulties encountered have induced many authors, especially in Ornithology and Entomology, to propose names for genera, subfamilies, and families without attempting a definition. The naked names thus introduced are a fit *testimonium paupertatis* for their authors. In our opinion, the thoroughness of the researches in systematic work can best be estimated from the degree of exactness

* The word "Stammart" is much employed by German writers in this erroneous and misleading sense. See Reichenow, in *Verh. V. Intern. Zool. Congress* p. 911 (1902).

of the definitions of genera and higher units. For the degree of exactness depends here (1) on the more or less intrinsic study of a larger number of forms than in the case of species and varieties, and (2) on the correctness of the author's inductive reasoning.

The classificatory category coming in our system of classification next to the species is the genus. Some authors interpolate between genus and species a category they call subgenus. From a comparison of a number of subgenera which have been defined, we are able to state that they had either no standing, being groups of species quite arbitrarily put together, or they represented well-defined homogeneous groups—*i.e.* were equal to a genus. We do not see any possibility of distinguishing between a defined genus and a defined subgenus. To call one defined group a genus and another defined group a subgenus is quite arbitrary. As there is a gap between every two species, and mostly between the varieties as well, and, further, as the species fall into groups different in extent or different in composition, according to this or that organ being taken as the basis of the grouping, the limitation of the genera would be entirely left to the personal opinion and ability of each individual classifier, if there was no general definition of what kind of classificatory unit a genus is meant to be. Systematists differ, indeed, very much in the extent given to genera, some authors adhering to large unwieldy groups of the Linnean type, and others erecting a genus for almost every species, and sometimes even for subspecies. In order to check arbitrariness, to escape uncertainty as far as possible, and to make generic classification more stable, we think it advisable to define a genus as *a classificatory unit one category* **higher** *than species comprising* **one** *definable group of species.*

In many cases the group contains only one species by the other members having become extinct, or by there being as yet only one species known, the other species being still undiscovered.

In the present Revision of the *Sphingidae* it has been our special endeavour to give a solid foundation to the genera, supplementing and rectifying the vague or faulty definitions with which the workers in this group of insects have contented themselves. Though many genera hitherto considered to be valid have been shown by us to have no standing, the number of genera of *Sphingidae* has been much enlarged, owing to the closer examination of the insects proving many groups of apparently similar species to be heterogeneous. We have laid special stress upon the genera as conceived by us representing stages in the evolution of the *Sphingidae*.

There is nowadays a tendency among British Lepidopterists to imitate some American leading spirits in Lepidopterology in shifting the term "family" (*familia*; designated by the ending *-idae* according to common consent) to a lower category than that to which it was originally applied. We do not see what good it serves to call, for instance, all the Hawk Moths together a superfamily, and the next divisions of it families. It is an entirely superfluous innovation, and only leads to confusion, like all shifting of

terms. We divide the *Sphingidae* into the following eight classificatory categories :—

I. Individual variety.
II. Generatory variety = seasonal variety.
III. Geographical variety = subspecies.
IV. Species.
V. Genus.
VI. Tribe.
VII. Subfamily.
VIII. Family.

Before we proceed to state some of the general results of our study of the *Sphingidae*, we give a summary of the morphology of these insects, which will enable the reader to more fully comprehend some of the conclusions bearing on phylogeny and distribution.

MORPHOLOGY OF SPHINGIDAE.

The dorsal skeleton of the **head** (Pl. LXII. f. 6) is divided by two transverse sutures into clypeus (*cl*), epicranium (*ecr*), and occiput (*occ*). The last is always a narrow transverse plate more or less distinctly placed at an angle to the convex epicranium ; it is as a matter of course longer transversely in those species in which the eyes have a more oblique position than in those which have less obliquely placed eyes. Compare Pl. LXI. f. 6 and Pl. LXII. f. 6. Its anterior edge is generally faintly incrassate in the middle. The epicranium forms laterally the sockets for the antennae, which stand nearer the eye in some Hawk Moths than in others ; the suture between epicranium and clypeus is just in front of the antennae, ending in the antennal grooves. The clypeus is the largest plate of the three; it is more or less strongly convex, especially mesially. It bears at the anterior margin the labrum (*lr*, Pl. LXI. f. 6. 8. 9. 10. 11, also Pl. LXII.). The two are almost merged into one, the suture being mostly not distinct. The labrum is in most instances raised to a large, transverse, cariniform tubercle, which is generally vertical in front. It projects sometimes frontad over the base of the tongue, concealing the mesial part of the epistome (*ep*), and is occasionally very small (Pl. LXII. f. 3). The epistome is a transverse plate of variable dimensions situated in front of the labrum, with which it is so completely fused that it is not easy to say where the one begins and the other ends. It is especially large in a number of *Ambulicinae* with otherwise reduced mouth-parts (*ep*, Pl. LXI. f. 10. 11 ; Pl. LXII. f. 4. 5).

This epistome covers the base of the tongue. When normal, it has a thin mesial lobe and a large process at each side. The mesial lobe varies in size and somewhat in shape, and is rarely absent (Pl. LXI. f. 10 ; Pl. LXII. f. 1), this occurring when also the other mouth-parts exhibit a high degree of reduction.

The lateral processes (*p*, Pl. LXI. f. 6—11; Pl. LXII. f. 1—5) are designated "pilifer" by Kellogg*), and are often erroneously considered to be homologous to the mandibles. The normal pilifer is a curved obtuse process, concave and flattened on the innerside, and is beset on the inner surface with a great number of long stiff bristles which project over the base of the tongue, which they touch. The pilifer and its bristles undergo various modifications. The bristles become modified into scales, either partly or all (Pl. LXI. f. 11), or they become fewer in number and disappear finally nearly completely (Pl. LXI. f. 10). At the same time the pilifer may become shortened and lose the appearance of a process, being represented in the most reduced state known to us by a broad obtuse projection (Pl. LXI. f. 10). Two other modifications are represented by Pl. LXII. f. 4. 5. In fig. 5 the pilifer (*p*) is almost stalked, and projects far beyond the mesial lobe, which is large. In fig. 4 the whole epistome is enlarged together, produced forward, the pilifers being close together and very broad, and projecting little beyond the mesial lobe, which is very small.

Quite different from these modifications is that observed in all the species of *Choerocampinae*, and only in this subfamily. Pl. LXII. f. 2 represents a species of *Celerio*: the pilifer (*p*) is long, somewhat twisted, and the apical portion is clothed inwardly with short bristles, while the proximal portion bears the ordinary long bristles, the two kinds of bristles contrasting very strongly with one another. This character is of surprising constancy; its significance in classification will be understood, when the characters of the palpus and antenna are taken into consideration at the same time.

Between pilifer and eye, supporting the former laterally, there is a more or less triangular projection, which is an enlargement of the brim which separates the eye from the large labial cavity of the underside of the head. We term this projection "genal process" (*gp* of Pl. LXI. and LXII.). The upper portion of this genal process is often distinctly separated by a suture, and corresponds to the mandible (*md*, Pl. LXII. f. 4), as pointed out by Kellogg, *l. c.* The genal process is very large in *Macroglossum* (Pl. LXI. f. 9), *Sesia*, and allied genera, reaching often to the tip of the pilifer. In the *Choerocampinae* (in all of them) it is smaller than anywhere else (Pl. LXII. f. 2), not showing in a lateral view the distinctly triangular form observed in all other *Sphingidae* with well-developed tongue. The suture between genal process on the one side and labrum and clypeus on the other ends often (many *Ambulicinae*) in a deep groove (*f*, Pl. LXI. f. 10. 11). If we examine the underside of the head after the removal of the labial palpi (Pl. LXI. f. 7; *flp* is the groove in which the palpus is inserted), we find again the pilifer and the genal process between eye and tongue, and observe below the pilifer close to the tongue on each side a short process, dilated apically in the species figured, which process is the remnant of the maxillary palpus (*mxp*). It is in most cases densely clothed with long white scales, which project beyond the pilifer and genal process, being visible also in dorsal and lateral aspects of

* *Amer. Naturalist* xxix. p. 546 (1895).

the head (Pl. LXI. f. 6. 8). The size of the vestigial maxillary palpus is not constant in the family, nor has the palpus always the same shape. The transverse arched stripe of chitin between the labial palpi is the mentum; in front of it we find often a vestigial, very feebly chitinised submentum.

The before-mentioned mouth-parts of Lepidoptera have attracted much attention on the part of scientific entomologists since Walter's now famous paper on the mouth-parts of *Micropteryx*.* The distinctions exhibited by them within the families of Frenata have, however, not been made use of in classificatory work. The parts are covered by the labial palpi as a rule, and are not visible without pushing the palpus away from the head. A drop of benzine, or, better, a drop of alcohol, applied to the base, is generally sufficient to make the palpus so flexible that it is movable, and allows the genal process and pilifer to be studied without injury to the specimen. The two parts of the capital appendices which remain to be discussed, tongue and labial palpus, are better known to the classifier, though the descriptions given of them go seldom beyond length of the former and outline and general aspect of the latter.

The length to which the tongue has developed in the family *Sphingidae* is an exceedingly striking character. Here we find the longest tongue of all insects. But what is far more interesting for the student of comparative morphology as well as the classifier is the fact that the length of the tongue varies in this family to such an enormous extent as it does, the extremes being represented by *Cocytius*, in which the tongue is sometimes little short of 25 cm., and *Polyptychus*, where we find species with a tongue represented by two tubercles barely longer than 2 mm.

A comparative study of the tongue (*glossa*) of Lepidoptera is a desideratum. It is formed by the first pair of maxillae, and consists, as is well known, of two halves closely applied to each other (Pl. LXII. f. 2). Each half is concave on the inner side, and bears at the upper inner edge a very dense fringe of ciliae. The trans-section is in *Sphingidae* short kidney-shaped, or nearly circular, apart from the inner concave portion. Laterally at the base the tongue has very often a patch of minute hairs; in a few cases hairs are found all over the dorsal surface. Within the cavity of each half we find, in dry specimens, a large trachea and the residue of the dried-up muscles, nerves, etc. The sucking-tube itself (Pl. LXII. f. 2, *tu*) formed by the two halves of the glossa is closed above by the fringe, the ciliae of which are soldered together to form a membrane, which is often quite smooth, showing no trace of transverse striation indicating the ciliae. When the tongue becomes reduced, the two halves are less firmly applied to one another, and the transverse striation of the closing membrane of the tube becomes distinct, till with the further reduction of the glossa the two halves separate and the closing membrane assumes the form of a fringe of separate ciliae (Pl. LXI. f. 11; Pl. LXII. f. 4. 5), this fringe finally disappearing (Pl. LXI. f. 10; Pl. LXII.

* *Jen. Zeitschr. Naturw.* v. 5. p. 751 (1885).

f. 1). The functionless tongue loses the transverse annulation ; it is very feebly chitinised, and varies individually in length. It not rarely bears scales, and is occasionally tuberculated.

The longest tongue occurs in the tribe *Sphingicae*, which tribe contains, however, also species with a very short and functionless tongue, and one species with just a vestige of it (*Ellenbeckia*). A short tongue is frequently found among the *Ambulicinae*, in which subfamily it is always shorter than the body, but often strong, and in the latter case not showing any sign of reduction. In the *Sphingulicae* the tongue is also very weak and short in most species. In the other groups of *Sphingidae* the tongue is never excessively long and never very short, always preserving the ordinary structure and rigidity. It is scarcely necessary to point out that the functionless glossa is a derivation from a tongue efficient as a sucking-tube.

As varied as the other mouth-parts are also the labial palpi, shortly designated as "palpi" in Lepidoptera. Though this designation is, strictly speaking, not correct, it is very convenient and quite precise enough, as there can be no doubt that the labial palpi, and not the vestigial maxillary ones, are meant, when speaking of *the* palpi.

The palpus, if not reduced, is large, broad in lateral aspect, closely contiguous to the head, and has a short third segment. A palpus like this does not occur outside the family. However, where the palpus is reduced, the general aspect is insufficient to recognise it as a Sphingid palpus. The most slender and at the same time longest palpus is found in *Tinostoma* and in the ♂ of *Cressonia*, in which latter genus the ♂ palpi are strongly divergent. A very large and rounded palpus is met with in *Pachylia*, *Eurypteryx*, *Protoparce*, and other genera. Reduced palpi occur abundantly among *Ambulicinae* and *Acherontiinae*, while the palpi of the other *Sphingidae* are mostly of medium size or large, very seldom small. The size of the palpus depends on the width of the segments and upon the scaling ; a broad segment covered by short scales appearing much slenderer than a narrower one with long erect scaling (Pl. LIX. f. 26. 27). It is, as a rule, also the scaling which gives the terminal portion of the palpus its particular shape. The triangularly pointed palpus and the broadly rounded one, as described in systematic work, may have similar segments when denuded. If one speaks of the shape of the palpus, one means the palpus inclusive of the scaling as it appears in a perfect specimen. There is distinct sexual dimorphism in the palpus among *Ambulicinae*, the palpus of the male being often larger than that of the female.

There are always three segments ; the third is, however, nearly always very short and concealed in the scaling of the second, projecting as a little knob. In the few cases where the third segment is more distinct it is conical, sometimes naked and horn-like (*Cocytius ; Xanthopan*) ; it is never long, slender, and rod-like. In narrow palpi it is often as broad at the base as the second segment is at the end.

The first segment is the longest as a rule, but there are many exceptions

in which the first is not longer or is shorter than the second. The segment is curved, lying along the eye. The inner surface (Pl. LIX. f. 26. 27 ; Pl. LX. f. 1) is more or less regularly annulated or wrinkled, flattened, or slightly convex, or somewhat concave. It is naked, except the edges, with some long hair-like scales ; or it is more or less loosely scaled for the greater part. The scaling at the apex of the first segment (Pl. LIX. and LX.) is either short, or long and rough, or long and quite regular, affording in several cases conspicuous characters of taxonomic value—as, for instance, in the subfamily *Choerocampinae*, where the two Neotropical genera and the cosmopolitan genus *Celerio* have the scaling always rough and irregular, while all the allied Old World genera with the exception of *Pergesa* and *Rhodafra*, derivations from *Celerio*, have it regular (Pl. LIX. f. 19—21. 26. 27). A character of the greatest importance in the classification of the Hawk Moths is found at the base of the first segment. That is a patch of variable size of short (and doubtless sensory) hairs, which is always present in one section of the family (*a*, Pl. LIX. f. 26. 27), except a few reduced forms, and equally constantly absent from the other section (Pl. LX. f. 1). The trustworthiness of the distinctive character was discovered after we had separated the *Acherontiinae* (= *Acherontiicae* + *Sphingicae* + *Sphingulicae*) and *Ambulicinae* from the rest of the family on other grounds. This basal patch was found in Butterflies and treated upon at some length by Reuter.* It is of wide occurrence in Moths. Its absence from *Acherontiinae* and *Ambulicinae* has nothing to do with the reduction of the palpus, as it is absent from the large palpi of *Protoparce* and other *Sphingicae*, while it is found in the other subfamilies on the relatively small palpus of *Oryba*, *Berutana*, and other genera. The basal patch is present in *Geometridae*, *Notodontidae*, *Agaristidae*, *Noctuidae*, *Pyralidae*, etc., etc., and assumes sometimes an obviously distinctive form. We have not noticed it in *Saturniidae* and allied groups, nor among *Lasiocampidae*, *Bombycidae*, *Eupterotidae*, and some other groups. How far this organ can be made use of in the classification of these families more complete research must show ; but we are justified in maintaining that the basal patch will prove itself elsewhere an equally good distinguishing character as we find it to be in *Sphingidae*.

The first segment of the palpus exhibits also on the outer side characters of taxonomic value. There is a kind of transverse crest near the eye in *Basiothia*, *Aleuron*, and *Unzela*, and the apex of the segment is strongly convex externally or angulate in these genera ; the crest is also found in *Gurelca* and *Sphingonaepiopsis*. A peculiar modification is found in one genus of *Acherontiinae* (*Megacorma*) and in a great number of *Choerocampinae*. It is illustrated on Pls. LIX. and LX. There is at the apex of the segment, ventro-laterally, a space devoid of the ordinary scaling, being either quite naked or clothed with a few long hair-like but flat scales. The scaling around this naked space,

* *Acta Soc. Sc. Fenn.* xxii. 1 (1896).—Reuter says that the basal patch of Heterocera is never elevated as in Rhopalocera. We find that it is sometimes raised to a conspicuous ridge, for instance in *Pyralidae*.

which is often somewhat concave, is more or less regular, especially ventrally, and, surrounding the naked space, forms a kind of cavity (*gr*, Pl. LIX. f. 13. 16. 17. 18. 25 ; Pl. LX. f. 3). The naked membrane is doubtless sensory, but we could not find any external sensory organs in the dry specimens. The long hair-like scales situated in many species on this naked membrane are not of a sensory nature. There is every intergradation between a rudimentary cavity and a large regular one. This specialisation is found only among Oriental and Aethiopian *Sphingidae*, not in American ones. The joint between the first and second segments is exposed in the species which exhibit the cavity. A naked and exposed joint is also met with among *Ambulicinae*, but no cavity.

The second segment undergoes many modifications in shape ; it may be subcylindrical, quadrangular, triangular, ovate ; it may be longer or shorter than broad, or square. In *Tinostoma* it is three times as long as broad. It is angulate at the upper outer corner in *Aleuron* and *Unzela*. The scaling of the two palpi generally covers the base of the tongue ; but there are instances where the mouth-parts are exposed. This is the case when the scaling of the second segment is very short, as in Pl. LIX. f. 10. 11. 26.

The inner surface of the second segment exhibits some remarkable specialisations. It is normally scaled all over, but we find the scales very small and rather dispersed in *Euchloron* (Pl. LIX. f. 24), so that the membrane is partly naked. In all the other species of *Choerocampinae* these small rounded scales have all, or nearly all, disappeared, leaving the segment bare except at the edges (Pl. LIX. f. 19—21. 26. 27). The character is quite constant, and occurs only in those species which agree also in certain characters of the pilifer and of the antennal end-segment, and form the subfamily *Chocrocampinae*. The scales at the upper apical angle of the segment with naked inner surface are either short or form a conspicuous tuft, which projects ventrad (Pl. LIX. f. 19—21. 26. 27). This difference is of importance, the absence of the tuft being characteristical for the fifty species of the purely American genus *Xylophanes*, which has, unlike the Eastern representatives of the subfamily *Choerocampinae* (*Rhodafra* and *Pergesa* excepted), the scaling at the apex of the first segment irregular, as stated above. We have not ascertained the true nature of the naked membrane, but assume that it serves as an organ of sense. A specialisation reminding one of that just described is found in the genus *Psilogramma* of the subfamily *Acherontiinae*. Here the segment bears a naked longitudinal stripe not far from the upper edge, the stripe appearing as a prolongation of the naked part of the first segment. The modification does not occur in the otherwise very closely allied genus *Leucomonia*.

A third modification peculiar to the *Acherontiicae*, but vestigial also in one genus of *Sphingicae*, is represented by figs. 1 and 2 of Pl. LX. Here the second segment is concave on the inner surface ; the scales at the edge of the cavity (*c*) project over it, forming a kind of roof. The concave part is either practically naked or scaled. The transition from the vestigial groove of

Xanthopan to the deep and naked cavity of *Acherontia* and *Herse* is found in *Megacorma* and *Coelonia*.

The third segment bears at the end a small and deep cavity of a sensory nature. We have not studied this organ.

The great variety in the structure of the antennae* of the Heterocera is repeated to a lower degree in most families of larger extent, and this makes it generally impossible to give of these organs a short family diagnosis which is true of all the species of the respective groups. The stereotyped description of the Sphingid antenna handed down from Linnean times applies only to a portion of this family. The prismatic, clubbed, and hooked antenna is by no means common to all the *Sphingidae*, a large proportion of the Hawk Moths deviating widely from this type. However, comparing each type of antenna of the present family with the corresponding types of other families, we shall always find some difference, and very often some striking difference, revealed by the closer examination of the special structures.

The generalised type of antenna of Lepidoptera is, in our opinion, that in which the dorsal surface is wholly scaled, while the ventral surface is scaleless, being clothed instead with a dense covering of fine hairs. This type is derived from an antenna entirely ciliated. Besides the protective scaling and the sensory ciliation there are other organs present, such as sense-bristles and -cones, both of which are rather easily discernible and of considerable taxonomic value. The scaling of the butterfly antenna is reduced apically and in a number of groups altogether absent, except the first segments (*Danainae*, Papilios allied to *sarpedon*, etc.). In Heterocera we find the scaling extending to the last or last but one segment, but meet also with antennae which have lost the scaling (*Saturniidae* and close allies ; *Pelochyta*). The arrangement of scales in two regular transverse rows on each segment which is prevalent among Butterflies, and is found also in a very great number of Moths, does not obtain among Hawk Moths except on the distal segments in a number of species, the scales being comparatively small and very numerous. Where among Butterflies and Moths the area covered by the fine sensory ciliae is reduced, the ventral surface becomes often partly scaled, the loss of the sensory function being followed by, or going hand in hand with, the appearance of scales, in Lepidoptera the normal clothing of the epidermis where no organs with special function are required. The proximal segments of the antennae of *Sphingidae* are occasionally nearly or totally scaled—namely, where the antenna is strongly clubbed. That means, where the sensory function is more concentrated distally, the proximal segments, which are reduced in width and function, have acquired an ordinary covering of scaling on the underside. This is most evident in *Rhopalopsyche*, a genus with also otherwise remarkable antennae. The appearance of scales as a sign of loss of function, or of weakness, is strikingly illustrated by other organs. We have seen above that the reduced tongue becomes scaled in some instances, and that the bristles of the pilifer are replaced in many reduced species by

* Compare Bodine, *Trans. Amer. Ent. Soc.* xxiii. p. 1 (1896) ; Jordan, *Nov. Zool.* v. p. 374 (1898).

scales. A further confirmation of the view just expressed, that the ventral scaling of the antenna is a relatively young character, we find in the fact that there are sometimes scales on the underside of the antennae of hybrids where there should not be any, these scales being doubtless an expression of weakened vitality. We predict that by breeding in and in specimens will result which show a more extended antennal scaling than the normal individuals. The antennae of the *Aegeriidae* and *Castniidae*, which resemble in general appearance somewhat a clubbed Sphingid antenna, differ essentially from the latter in having the greater part of the ventral surface scaled, agreeing in this respect with the antennae of a great many *Tineidae*. Among the latter family (or group of families, perhaps), and among the *Limacodidae*, we find antennae which are almost entirely covered with scales.

Before following the somewhat complicated development of the sensory surface, we shall shortly refer to the sense-cones and sense-bristles. The sense-cones discovered by Bodine do not occur in Rhopalocera, but are widely distributed in Heterocera. They are ventral, mesial, and apical in *Sphingidae*, one on each segment, except the end-segment and the basal one or ones (Pl. LX. f. 4—29, *ec*), from which they are absent. The cones of the distal segments are generally more prominent than those of the proximal segments. They do not always stand exactly at the apical edge of the segment, being not rarely removed somewhat basad (compare, for instance, *Herse convolvuli*). However, they are never absent and never abandon the mesial position in this family. They are wanting in the *Castniidae*, *Aegeriidae*, and *Zygaenidae* ; their absence is a distinctive character not difficult to recognise. They are present on the clubbed antennae of *Agaristidae* and *Cocytia*.

The sense-bristles are stiff hairs of varying length. The Lepidoptera most primitive in respect to these organs have a complete belt of such bristles on each segment. Among Rhopalocera we find such a belt preserved in *Lycaenidae* and *Hesperiidae* ; we meet with it again among the *Jugata* and many Heterocerons *Frenata*. Some of the dorsal bristles are, however, generally reduced and covered by the scaling. This is the case also in *Sphingidae*. The normal number of the bristles found in the Hawk Moths on the non-scaled surface, if we except the end-segment, is two on each side (Pl. LX. f. 14), one being dorso-lateral, the other ventro-lateral and basal. The number is sometimes doubled ; but there is never a complete transverse series, and the bristles are never apical, the Sphingid antenna differing therefore obviously from that of *Agaristidae*, *Zygaenidae*, and many other clubbed and non-clubbed antennae.

The dorso-lateral bristles situated close to the edge of the scaled area are very often so prolonged and become so stout that the antenna has the appearance of being pectinated ; in fact, that bristle has often been mistaken for a pectination.* We meet with this development very commonly in filiform and setiform antennae, but never among *Sphingidae*.

The ventral and lateral surface of the antenna of Heterocera, as far as

* *Nov. Zool.* iii. t. 1. f. 5—11.

it is not scaled, is covered with ciliae, only the parts near the joints and close to the dorsal scaling being in many cases naked or sparsely ciliated. Pagenstecher * calls the antennae of *Callidulidae* "naked," and Hampson † describes those of *Agaristidae* as being "not ciliated." Both authors are wrong, the antennae of *Callidulidae* and of *Agaristidae* being scaled above and ciliated below. There is no antenna among Lepidoptera which is not ciliated, and the term "naked" can with some justification only be employed for antennae which are not scaled, and therefore have a naked dorsal surface (apart from some bristles and setiferous pits). The evenly ciliated ventral surface as we find it in Rhopalocera among the *Lycaenidae* and *Hesperiidae*, and in great abundance among the Heterocera, more especially in the female sex, far less often in the male sex, represents a generalised state of development from which a variety of specialisations have started, which, though resulting in widely different structures, have nevertheless all the same tendency—namely, to make the antenna more efficient as an organ of sense. This is accomplished by enlargement of the area bearing the sensory organs—*i.e.* by the increase in their number—or by concentration of the organs, or by enlargement of the organs themselves, these modifications obtaining either singly or together. The concentration of the ciliated area into such well-circumscribed grooves as are described and figured in Nov. Zool. vi. p. 374. t. 14. 15, does not occur among the Heterocera. The enlargement of the distal part of the antenna into a club, which is normal for Rhopalocera, among which non-clubbed antennae are extremely rare (*Pseudopontia*), is met with in a number of Heterocerous families, such as *Castniidae*, *Aegeriidae*, *Sphingidae*, *Zygaenidae*, *Agaristidae*, *Callidulidae*, and also among *Geometridae* and *Noctuidae*. As regards mere outline, the clubbed antennae of representatives of different families are sometimes not distinguishable. The Australian *Castniidae*, which appear to form a different subfamily from the Neotropical species of that family, resemble in the short and abrupt club certain *Pieridae*, and some *Hesperiidae* and Neotropical *Castniidae* have practically the same antennal outline as some *Sphingidae*. The most strongly clubbed antenna of *Sphingidae* we find in *Haemorrhagia* and *Rhopalopsyche*; from these to the setiform antenna of *Megacorma* there occur all intergradations in shape. It is by no means only the ciliated surface which becomes expanded in the clubbed antennae of *Sphingidae*. The dorsal area is often proportionally more enlarged than the ventral area. This can best be seen in a frontal view of a segment of the club of *Cephonodes* or *Haemorrhagia*, where the axis of the club will be found further ventral than in a segment from the middle of the antenna. By axis we mean an imaginary hollow cylinder of the width of the joints.‡ There is no real axis, each segment representing, so to speak, a box with an opening each at the proximal and distal sides. The edge of this opening is more or less raised and joined to the edge of the opening of the next segment. The diameter of the cavity of the

* *Tierreich* xvii. (1902). † *Lepid. Phalaenae* iii. p. 515 (1901).

‡ Joint and segment should not be confounded.

segment containing the nervular, muscular, and vascular apparatus is larger than that of the openings, which serve as doors to the cavity. That is espécially the case in the segments of the club, as can be seen in fig. 19 of Pl. LX., which represents the left half of a segment, divided sagitally, of the club of the antenna of *Haemorrhagia fuciformis*, viewed somewhat from the distal side to show the distal surface. The difference in the position of the axis is illustrated by figs. 17. 18. 25 of Pl. LX.

The fine ciliae are never essentially prolonged in Rhopalocera ; they are also short in some families of Heterocera—for instance in *Castniidae* and *Agaristidae*. In such cases the two sexes do not differ, or differ only slightly in the antennae. Among the *Sphingidae* there is only one genus (*Rhopalopsyche*) in which there are no prolonged ciliae in either sex. Such instances as these are quite an exception among Heterocera, the antennae of which show generally marked sexual dimorphism. The specialisation refers to the length and arrangement of the ciliae and to the configuration of the ciliae-bearing surface.

The ciliae are seldom nearly all prolonged and irregularly distributed. Of more common occurrence is that specialisation in which some of the ciliae have become long and are arranged in a subapical and a subbasal vertical row, the two rows becoming fused into one dorso-laterally, forming a kind of flattened half-ring in a lateral aspect of the antenna. These seriated ciliae are apparently always fasciculated, two or more ciliae arising from a common tubercle (Pl. LXI. f. 1—4), or from a common pit. The ciliae of the two rows curve towards each other and project laterally, so that they form a kind of pocket in a ventral aspect (Pl. LX. f. 15). The apical row does not extend so far ventrad as the basal row, and the ciliae in and near the ventral mesial line are always shortened in *Sphingidae*. The ciliae of the apical row are shorter than those of the ventral row ; compare Pl. LX. f. 17, distal aspect. These fasciculated ciliae as illustrated on Pl. LX. are not confined to the *Sphingidae* ; they are found in *Notodontidae*, *Noctuidae*, *Arctiidae*, etc., etc. However, they occur in all the males of Hawk Moths, except *Rhopalopsyche*, and are also present in a good many females, though they are here always developed in a lesser degree than in the respective males.

The fasciculated prolonged ciliae are not present on cylindrical antennae. Their appearance is always accompanied by a modification of the surface of the segments. The lateral surface encircled by the rows of ciliae becomes flattened or impressed, and the segment dilated ventrad and compressed, appearing somewhat prismatical in a distal or basal aspect (Pl. LX. f. 17). The depth of the lateral groove and the length of the ventral projection are very different, not only in various *Sphingidae*, but also in other Heterocera (Pl. LX. f. 17. 25. 27). The ventral projections of the adjoining segments lie either closely together, or are more or less separate (Pl. LX. f. 16. 22. 26. 27). The ventral outline of the segment is in most cases nearly straight, but in many *Sphingidae* and other Heterocera we find the segment sinuate in a lateral view (Pl. LX. f. 22. 26)

to a more or less obvious degree. Such serrate antennae are not rarely found among the *Ambulicinae*. The sinuous ventral outline does not occur in clubbed antennae, in which also the lateral grooves are less deep and less large than in non-clubbed antennae.

A step further than the ordinary fasciculated antenna is that in which pectinations make their appearance. As there are no fasciculated antennae among Rhopalocera, so there can be no pectinated ones, as the latter type is a derivation from the former. We are accustomed to speak of pectinated antennae, if the segments have lateral expansions or branches. The term comprises, however, morphologically very different elements. Among *Sphingidae* there occur only two kinds of pectinations, and these alone we shall deal with. We see from fig. 16 of Pl. LX. that the dorso-lateral part of the segment just above the groove is somewhat dilated laterad; the expansion is more distinct in a frontal aspect (Pl. LX. f. 17). If this dorso-lateral expansion becomes more or less prolonged, we have a strongly or a slightly pectinated antenna of the form represented by figs. 23. 27. 28. 29 of Pl. LX. If the scaled dorso-lateral area takes part in the expansion, the side-branches are scaled above (Pl. LX. f. 29); if the expansion is restricted to the non-scaled area, the pectinations are naked above. Comparing figs. 16. 17. 23. 27, it will be obvious that, the branches being lateral expansions of the upper edge of the grooves, the ciliae are naturally confined to the under surface of the pectinations. This type of pectination is of wide occurrence, being met with in many families of Heterocera, and is easily distinguished from another type, not found in *Sphingidae*, which has the ciliae all round the side-branches. At the tip of the branch we find generally a prominent sensory bristle (Nov. Zool. iii. t. 4. f. 3. 4), corresponding to the dorso-lateral bristle of setiferous antennae. The pectinations of Sphingid antennae have no such bristle at the ends. Rudimentary (= incipient) pectinations are rather often observed among *Ambulicinae* (= *Ambulicinae* + *Smerinthinae* of Butler), while distinctly pectinate antennae are rare; Pl. LX. f. 28. 29 represent those in which the branches are longest, one an Ambulicine species, the other an ally of *Macroglossum*. In the latter species the branches of the inner (anterior) side are somewhat longer than those of the other side. Such asymmetrical development is very common in the antennae.

The second type of pectinated Sphingid antenna is illustrated by figs. 1—5 of Pl. LXI. In figs. 1 and 2 (*Polyptychus mutata*) we see the dorso-lateral expansion (*dlp*) well developed, and observe that its underside bears a number of fascicles of ciliae. These ciliae stand mostly upon tubercles like the more ventral fascicles, and the ventro-lateral tubercles are seriated and are situated upon a slightly raised carina (*vc*). If these two carinae, one apical and the other basal, become higher and higher, or are produced laterad, what will be the result? We shall have a segment with **two** processes on each side, the processes being compressed and bearing like the carina the fasciculated ciliae at the narrow edges, not upon the flat vertical sides (Pl. LXI. f. 3. 4. 5). This very peculiar type, which comes close to the type found in most *Saturniidae*

and near allies,* but is not identical with it, occurs only in two species of *Ambulicinae*, each representing a genus of its own—namely, *Monarda* and *Cressonia*. In figs. 1 and 2 both kinds of Sphingid pectinations are incipient. If the dorso-lateral expansion (*dlp*) became prolonged, the result would be a pectinated antenna of the first type; if the subventral carinae (*cc*) became prolonged, we should have a pectinated antenna of the second type. The dorso-lateral expansion is very rudimentary in *Monarda* and *Cressonia*, and the upper fascicles stand apart from it, having in a dorsal aspect (Pl. LXI. f. 5) the same appearance as in ordinary fasciculated antennae, this being a special feature of the Sphingid bipectinated antenna. The asymmetry of the segment is distinct in fig. 4.

As said above, the fasciculation, pectination, and the compressed shape of the antennae obtain in a much higher degree in the male than in the female; very often the female antenna is simple where the male antenna is complex in structure. Now, the question arises, Does the simple antenna really represent the more ancestral state of development as maintained above, or is the simple cylindrical segment derived from a more complicated segment in consequence of the reduction or loss of the special structures? Poulton, from researches on the pupae of some *Saturniidae*, came to the conclusion that the second alternative was correct—namely, that the short-branched Saturniid female antenna was a development by reduction from a longer-branched antenna. Though the conclusion was perhaps rather hasty, inasmuch as the fact was not taken into account that the specialisations of the male are often transplanted on to the female, it was nevertheless suggestive, and served to draw the attention to a neglected point. If one considers the case of the similarity in the sexes of *Rhopalopsyche* by itself, one must come to a conclusion similar to that arrived at by Poulton. For the absence of fasciculated ciliae from the male of *Rhopalopsyche* cannot be explained by assuming that this genus had preserved the original simple state of ciliation; such an explanation seems to us to be almost absurd, considering that *Rhopalopsyche* is in all other respects very specialised, and is the only exception from the rule among all the *Sphingidae*. And therefore there remains only the second alternative—that the male antenna of *Rhopalopsyche* has lost the fasciculated ciliae, and thus become simple. If that is true—and it cannot be seriously doubted, we think—one might conclude with some degree of justification that the same line of development from the complicated to the simplified observed in this male obtained also in the female sex of *Sphingidae*; that is to say, that the simple female antenna of *Sphingidae* was a derivation from a fasciculated female antenna. And it might further be advanced, as a confirmation of the evidence upon which that conclusion is based, that there is a wide-spread tendency of retrogressive development in *Sphingidae*, to which we shall have to draw attention in many places of this Revision. However, when we take into consideration the two types of pectinated antennae found within the same subfamily of *Sphingidae* (*Ceridia*, Pl. LX. f. 27. 28;

* Smith, *Ent. Amer.* iii. p. 2 (1887); id., *Trans. Amer. Ent. Soc.* xv. p. 230 (1888).

and *Cressonia*, Pl. LXI. f. 3. 4. 5), the question assumes a different aspect. Following the same line of argument, we should have to attribute to the ancestor of *Ceridia* an antenna with long pectinations of the first type in both sexes, and to the ancestor of *Cressonia* one with long pectinations of the second type. Therefore, according to this, the common ancestor of both genera, or the ancestor of the subfamily *Ambulicinae*, would have had an antenna combining both types of pectination—namely, a long subdorsal branch and two long subventral branches on each side, a type which does not occur anywhere. If we go further and construe by a similar line of argument the ancestral type of antenna of *Saturniidae* and *Notodontidae*, and then that of the common ancestor of these families and the *Sphingidae*, we arrive at a form of antenna combining all the various types of pectination which are morphogenetically different. In short, if the above line of argument were correct, we should have to attribute to the ancestral antenna of the Lepidoptera all those special features found in the Order which are not derivations from one another. That would be absurd. And yet, if we look over the literature bearing on classification, we often encounter absurdities akin to the above.

Going back to the alternative presented above, we hope to have now shown that the pectinated antenna is indeed a derivation from the fasciculated one ; that the pectinated antennae of the males are more advanced than the simple or the less strongly pectinated antennae of the females, these coming nearer the ancestral form.

As said above, the specialisation of the male antenna is often observed in the female—the groove, the fasciculated ciliae, and the pectination being more or less distinct. We shall call such female antennae andromorphic in the body of this Revision. There are female antennae which are much more strongly compressed and deeper-grooved, and have longer fasciculated ciliae than the male antennae of other species (compare the genus *Polyptychus*).

The sexual differences observed in the antennae of *Sphingidae* and other Heterocera are either such of degree, where the male characters reappear in the female, or of kind, where the special male characters are quite absent from the female ; and the occurrence of such sexual dimorphism is an indication of differences in function, and not of different capacity in the sexes of acquiring the specialisations. In other organs the females are not rarely more advanced than the males ; there is therefore no general rule in this respect. However, it is true of the antennae that the female sex is never in advance of the male. This is explained by the different rôle the sexes play in courtship, especially in finding one another, the male antenna being very specialised in cases where this sex has to search for the sedentary female. The sluggish *Ambulicinae* have, in accordance with this explanation, on the whole more strongly compressed, grooved, and ciliated antennae, and more often subpectinate ones than the members of the other subfamilies of *Sphingidae*.

Specialisations of one sex are latent in the other, and may occasionally put in an appearance where they are normally absent. For instance, the metallic

colours of males are found sometimes in females in sexually very strongly dichromatic species, such as *Papilio priamus*. The occurrence of andromorphic female antennae is, we think, in many cases due to a similar transmission. In several instances the male characters are the stronger pronounced in the female antennae of *Sphingidae* the more marked the specialisation is in the male antennae; while, on the other hand, there are species with almost simple female antennae in spite of the highly specialised male antennae. *Polyptychus carteri* and *Cressonia juglandis* are good illustrations for the one and for the other type. Where the male specialisation is not at all or only in a very slight degree transmitted to the female antenna, there must be some cause at work checking the transmission.

The most distal segments, which we have as yet not taken into account, are more or less similar in the sexes. The well-known hook in which ends the antenna of very many *Sphingidae*, but not of all, occurs in all subfamilies. The segments are broader and longer ventrally and dorsally (Pl. LX. f. 11. 12). The ciliae-bearing surface is thus more exposed, and doubtless made more efficient. The special male features are not, or slightly, marked on the most distal segments; the cone is prominent, and the sensory bristles are often more numerous and longer than on the more proximal segments. The last but one and the previous segments are occasionally conically produced ventrad (Pl. LX. f. 7). Of particular taxonomic value is the end-segment. The length and shape, and the clothing with scales and bristles of this segment, vary very much and offer good distinguishing characters of genera and even tribes. Figs. 4—12 of Pl. LX. are illustrations of various kinds of end-segments. The segment is very thin and very long, almost filiform, bristle-like; or thin and short; or broad, compressed, elongate-conical in side-view; or short, broad, and conical. All the end-segments which are produced into a filamentous process like figs. 4. 5. 9, or are very thin and cylindrical (figs. 11. 12), we call long; and those which are not produced into such a process and are conical in a lateral aspect we call short (Pl. LX. f. 6. 7. 8. 10). The scaling is often very sparse, loose, and rough (Pl. LX. f. 4. 9); it projects often as a kind of tuft beyond the tip of the segment, if this is short (Pl. LX. f. 6. 7). The sensory bristles are in most cases irregularly distributed. Many species have two at the extremity. In *Haemorrhagia*, *Sesia*, *Macroglossum* and genera with similar antennae the slender end-segment has several long bristles at or near the tip (Pl. LX. f. 11), the segment resembling that of the subfamily *Choerocampinae*, in all species of which we find a slender but comparatively short end-segment (Pl. LX. f. 12), which bears six or more long apical and subapical bristles. The same end-segment is met with in *Panacra*, but nowhere else. This brush of hairs reminds one of the end-segment of *Aegeriidae* and Neotropical *Castniidae*. The brush of these insects (Pl. LX. f. 13) differs, however, very essentially in consisting of a great number of long, hair-like, flattened scales.* Incidentally we mention that *Paranthrene*, which is considered an Aegeriid, has no aegeriad antennae,

* These scales look too much like bristles in the figure.

but tineiform ones, and surely does not belong where it stands in the Catalogues. The only end-segment which would be confounded with that of a *Castnia* or *Aegeria* is found in *Enyo*, where the segment is provided with a brush of long narrow scales which stand all round the segment apically. Both the long and slender segment, and the short and broad one, are of equally wide distribution among the Hawk Moths. The long type, as illustrated by figs. 4. 5. 9 and 11. 12 of Pl. LX., does not seem to occur outside the family. It is found in all *Sphingicae* (except *Oligographa*), *Acherontiicae*, a few *Ambulicinae*, and many *Sesiinae*, *Philampelinae*, and all *Choerocampinae*. The short type of end-segment has no special Sphingid character by which it could be distinguished from the end-segments of all other Heterocera.

The question whether the long or the short end-segment is the more generalised in *Sphingidae* has puzzled us a good deal. Judging from the other Heterocera, one is inclined to pronounce the short segment to be the original one. And this is doubtless true as regards the Heterocera as a whole. But if we consider the development of the antennae and other organs in *Sphingidae*, we find that the forms with short end-segment in the subfamilies *Sesiinae* and *Philampelinae* are doubtless derivations from more generalised forms which have a long end-segment. Compare, for instance, *Temnora*, *Antinephele*, *Gurelca*; and *Deilephila* and *Darapsa*. Further, we observe in the *Ambulicinae* that the genera *Amplypterus*, *Protambulyx*, and *Oxyambulyx*, which have a long end-segment, are in many respects more generalised than the allied genera *Trogolegnum*, *Orecta*, *Callambulyx*, etc., which have a short end-segment. Therefore we conclude, that the general tendency of reductive development observed in the palpi, legs, tongue, etc., applies also to the end-segment of the antenna. We attribute accordingly a long thin end-segment to the ancestral Sphingid as a distinctive feature.

The eye does not call for many remarks. It is subglobular, its edge being either nearly circular, or regularly rounded above and more straight below and behind. Its anterior edge is less widely apart from the mesial line of the head than the hinder edge, the eye being oblique in position, the head narrowing frontad. This is most evident in *Macroglossum*, *Sesia*, *Haemorrhagia*, and allies (Pl. LXII. f. 6). The eye varies much in size; the largest eye is found in *Oryba*. Where the mouth-parts are much reduced or obliterated, the eye becomes also reduced. It is never hairy itself, but is often covered above by a kind of eye-brow, and below by a large tuft of hairs, which is especially large in *Rhodoprasina*, where the tuft covers the lower half of the eye (Pl. LIX. f. 12). We have not found a vestige of the ocelli.

Before entering upon the description of the thorax and its appendages, we think it necessary to emphasise what will have become evident to the reader: (1) That there is an obvious tendency of reduction in the head and mouth-parts; (2) that this tendency is far more apparent in the *Sphingidae* without basal patch of sensory hairs on the inner surface of the first palpal segment than in the others; and (3) that the reduction of the cranium, eye, and

mouth-parts occur generally together, and are accompanied by the appearance of roughness in the scaling of the head and often by the appearance of scales on the pilifer and tongue in place of bristles and hairs. The roughness of the scaling is here a sign of weakness of the species, suggesting an analogy with the shagginess of weakly *individuals* of mammals.

Little has been published bearing on the comparative morphology of the trunk of the thorax of Lepidoptera, authors having confined themselves generally to a comparison of the thorax of the *Lepidoptera Jugata* with that of the *Frenata*. One of us has given an account of the mesosternite of the *Rhopalocera*,* and tried to unravel the homology of the various plates composing the sternal part of the mesothorax. Our researches on the thorax of the *Heterocera* are not yet ripe for publication. The sterna of the various Heterocerous families are more equally developed than in the families of Butterflies; such specialisations as we have found there do not occur here. But there are also in the *Heterocera* thoracic characters distinctive of genera, tribes, and families. The most variable part of the thorax within a Heterocerous family is generally the metanotum. We shall restrict our description to the thorax of the *Sphingidae*.

The denuded prothorax does not apparently offer characters of taxonomic value in this family. The mesonotum (Pl. LXII. f. 6, dorsal view; Pl. LXIII. f. 1, lateral view), composed of the praescutum, scutum, and postscutum (= scutellum), is very large, as in most *Frenata*, occupying by far the larger part of the notal region, the pro- and metanotum being quite small as compared with the mesonotum. The praescutum (*prsc*) is distinctly triangular in dorsal view, penetrating between the halves of the scutum, or it is transverse. It is vertical in lateral aspect. The scutum (*msc*) is widest behind and little longer than broad; the mesial suture vanishes in front or is here vestigial. The postscutum (*mscl*) varies obviously in size and shape (Pl. LXII. f. 6. 8), the anterior and posterior angles being more acute in *Macroglossum*, *Sesia*, and some allies than in most other *Sphingidae*.

The praescutum of the metanotum is not visible in the figures. The scutum (*mtsc*) is divided like that of the mesonotum, but the two halves are widely separate, the postscutum of the mesonotum projecting between them. The postscutum (*mtscl*) is always narrow. In *Sesia* and allies (Pl. LXII. f. 6) it is overlapped by the mesothoracical postscutum, which reaches to the first abdominal tergite, while it is free in the other *Sphingidae* (Pl. LXII. f. 8; Pl. LXIII. f. 1).

The ventral parts of the meso- and metathorax are never so different in size in any *Frenata* as are the nota, though also here the mesothorax is the larger of the two. Pl. LXII. f. 7 represents the mesosternite in a frontal aspect, the dorsal and ventral mesothoracical endoskeleton (*endosc*) being visible in the cavity of the thorax. The mesial plates of the sternite, the sternum (*st*), and peristernum (*pest*) are not completely separated from one another; the sternum is elongate-triangular; there is generally a small membranaceous area

* *Verh. V. Intern. Zool. Congress* p. 816, t. 1. 2. 3 (1902).

at the upper end of the mesial suture. The peristernum (*pest*) is always subvertical, as in other Lepidoptera, with the exception of the higher Rhopalocera (*Papilionidae*, *Pieridae*, *Nymphalidae*, and some *Erycinidae*), in which it is a transverse belt, and in which the sternum has assumed a pentagonal shape. It is large in *Sphingidae*, and remains broad at the obliquely truncate upper end, where it leans against the parasternum (*past*). This is a large plate, extending obliquely dorsad and mesiad from the meral suture (*smn*, Pl. LXIII. f. 1), separating the meral and sternal parts of the sternite, to the membrane connecting meso- and prothorax. The plate is angulate behind at its upper corner. It is large in *Hesperiidae* and all *Heterocera*, and always small in the Butterflies. Between it and the notum the mesothoracic tegula (*mtg*) is inserted. Below the parasternum we find the episternum (*est*), with which are fused the hyposternum (*hyst*) and the marginal stripes along the coxal cavity. The suture between episternum and sternum is distinct, while it becomes occasionally obsolete at the upper end near the parasternum, where it separates the episternum from the peristernum. The episternum is always obliquely truncate, with the upper inner angle more or less pointed, owing to the large development of the parasternum. In the Butterflies (except a portion of the *Hesperiidae*) it is quite different in shape, the mesosternite of a Butterfly being always distinguishable from that of a Moth by the development of the para- and episternum. In *Sphingidae* and several other families of *Heterocera* sternum and episternum are separated, while the latter and the hyposternum are merged together. There is another group of families in which sternum and episternum are fused, while the comparatively large hyposternum is free. This distinction is possibly of value in the examination of the true phylogenetic connection between the families of *Heterocera*.

The division of the meral half of the sternite into plates, some of which are visible also in a frontal view of the breast, will be understood by comparing Pl. LXIII. f. 1. 2, which are representations of the breast in a lateral aspect. The meral suture is more heavily drawn in these sketches than the other sutures, in order to make the division into a meral and a sternal part more obvious. Along the meral suture we find two more or less strongly convex plates, which may be termed the paramerum (*pam*), corresponding to the parasternum, and the protomerum (*prm*), corresponding to the sternum. The area behind these two plates is occupied by the large epimerum (*epm*), corresponding to the episternum ; from the epimerum is separated by a more or less distinct suture, which often vanishes behind, a marginal stripe (*mp*), situated along the meral cavity (= posterior part of coxal cavity bearing the merum), and divided by a vertical suture into a small frontal piece and a large posterior stripe. The epimerum becomes membranaceous above. In this membranaceous area, between forewing and episternal plate, we observe a curved stripe of chitin, serving most likely as a kind of spring.

The metasternite is more simplified than the mesosternite. The episternum and epimerum are the only large plates ; the other plates are more or less

fused with them, the sternum being, however, always preserved as a narrow separate stripe.

The coxa is inserted in a groove formed by the sternal part of the sternite ; it bears the trochanter (*troch*), and is supported behind by the merum. It will be observed from the figures that the midcoxa is much slenderer than the merum, while the hindcoxa is larger than the respective merum. There is a very remarkable specialisation found in the merum. The hinder edge of the merum is normally rounded ; but in *Pachylia*, *Nephele*, and other genera the edge becomes carinate and angulate ; in the higher *Sesiinae* and *Philampelinae* the angle assumes more and more the shape of a sharp triangular process, reaching the highest point of specialisation in *Cephonodes* (Pl. LXIII. f. 2). The mesosternal merum shows this specialisation first, the metasternal one slowly following. The processes project so far sideways that there is room for the femur between the process and the breast. The femur is generally found in this position. The object of this specialisation is doubtless to prevent the legs and the incision between meso- and metathorax from being a hindrance in the darting flight of the insects. This becomes quite evident when we compare the abdomen, which is closely appressed to the breast in the forms with strongly angulated merum, and bears very strong and flat spines, making the abdomen very smooth.

In the upper corner between coxa and merum we find the trochantinus (*tchin*), a small plate which is more or less subglobose. The femora do not offer any characteristic points. It is a curious fact, however, that they remain always simple, even in cases where the tibia has become strongly spinose. Tibia and tarsus undergo several modifications. Their relative length is often variable either specifically or generically. A tibia clothed with scales and some hairs, and truncate at the end, may be called a normal one. The apex of the foretibia is often produced into a strong process (a thorn), which character is sometimes of generic, sometimes only of specific value (Pl. LXIV. f. 16). Such a thorn is found here and there in all subfamilies (except *Choerocampinae*). It is a specialisation often combined with other specialisations. It would, however, be erroneous to say that a species possessing the thorn was in every respect more specialised than the allied species which is devoid of that character. For instance, *Cephonodes picus* has an armed foretibia, while *hylas* possesses no thorn, but *hylas* has a decidedly more specialised sexual armature.

The spinosity of the tibiae is often an accessory character found in the species which show reduction in the appendices of the head and thorax. But the appearance of the spines is not invariably associated with a reduction of the legs in length, nor are the spines always met with on reduced tibiae. Spinosity of the tibiae occurs commonly among *Acherontiinae* and *Ambulicinae* ; it is also found in some genera of *Sphingidae semanophorae*. The spines appear first near the apex of the tibia, and the foretibia is the first, the midtibia the second, and the hindtibia the last to acquire spinosity. The hindtibia is frequently much more densely spinose than the midtibia, and the foretibia

has the spines mostly along the outer edge, where they become sometimes very stout and long (*Proserpinus* ; *Arctonotus*). The spurs of the tibiae are organs of much importance in the classification of Moths, their number and length being constantly made use of in systematic works in the definition of genera.

The epiphysis or spur of the foretibia,* which we consider homologous with a proximal spur of the hindtibia, varies in length and position in the *Sphingidae*. It is never absent, as in *Chalcosiidae* for instance. The most remarkable form is that in which the fringe is obliterated (*Ceridia*). The midtibia has one pair of slender spurs, which end in a naked point as a rule and are proximally generally cylindrical. They are sometimes of the same length, but as a rule the outer or anterior one is shorter. A quite exceptional development found among the species of the American Choerocampine genus *Xylophanes* leads to the onter spur being the longer one of the two. The variation in length is considerable, the longer spur being sometimes as long as the tibia and frequently barely longer than the tibia is broad. There are on the spurs generally some long hairs, which develop often into spines. The spinosity of the spurs is a feature often met with in species with spinose tibiae, and is, like the latter, a sign of reduction or weakness.

In some cases we find a series of stiff scales along the side towards the tarsus, resembling a serrated crest (*Macroglossum*) ; while there occurs a conspicuous comb of bristles on the shorter spur in *Nephele* and *Centroctena* (Pl. LXIV. f. 8). The comb of *Nephele* and *Centroctena* has most likely the same function as the comb of the tarsus, as described below. The midtibial spurs are never absent from *Sphingidae*.

The hindtibia possesses normally two pairs of spurs, one terminal, and the other more proximal, situated sometimes in or near the middle of the tibia, sometimes near the terminal spurs. The shape and structure of the hindtibial spurs resemble those of the midtibia ; they are longer on an average, the longer apical hindtibial one being never shorter than the longer midtibial one, but very often surpassing it in length. They are less often spinose ; the inner one is never shorter than the outer one of the same pair, and the comb or crest found in *Nephele*, etc., is less strongly developed. The proximal pair disappears very often. The gradation from a tibia with long proximal spurs to one without a trace of them is complete, there being many species with very short spurs, and one (*Parum porphyria*) in which there are two very short proximal spurs or only one or no spur. Here we have a case where there can be no doubt about the direction of the line of development. The absence or reduction of the proximal pair of spurs is a specialisation, the species thus characterised representing a younger stage of development than those in which the proximal spurs are long. And therefore we can safely conclude that also in the case of the midtibial spurs shortness is a sign of reduction. Short spurs are seldom found outside the *Acherontiinae* and *Ambulicinae*, and the cases where the proximal pair of the hindtibia is absent are nearly all confined to those two subfamilies,

* Kathreiner, *Illustr. Zeitschr. Entom.* iv. p. 113. 161. Plate (1899).

the only species with one pair of hindtibial spurs not belonging to those groups being a member of the *Philampelinae* (*Microsphinx*).

We agree with Kolbe in considering the spurs to be modified spines; they are morphologically homologous with hairs, but they are spines with a matrix of their own which develops scales, hairs, and spines giving the mid- and hindtibial spurs the same covering as have the tibiae. It sounds curious that we are speaking here of a scaled and hairy hair, but it is nevertheless correct. We refer the reader to another instance where an ordinary spine has developed into a scaled organ similar to the spurs. One of the ventral rows of spines on the tarsus is in some *Syntomidae* more prominent; the spines are longer and stouter than ordinarily, and are densely scaled!

There are normally four ventral rows of spines on the tarsus of Lepidoptera. The regularity of these rows is very often disturbed by intermediate spines, or by the disappearance of spines. A remarkable development commonly found in *Noctuidae*, *Arctiidae*, *Agaristidae*, *Syntomidae*, *Cocytia*, etc., but not met with in *Sphingidae*, is that in which the two inner rows merge together into one, so that there are apparently only three rows. In *Zygaenidae*, *Lasiocampidae*, some *Geometridae* and *Notodontidae* the ventral spines are very numerous and arranged in more or less regular transverse series. The lateral and dorsal sides of the tarsus are also spinose; the latter spines of the compressed mid- and hindtibiae, for instance, are very numerous. The anterior tarsus shows different modifications in the spines from the mid- and hindtarsi. The external row (or row 1) of the foretarsus contains often some long spines (Pl. LXIV. f. 1—5); not rarely these long spines alone are present and are enlarged to curved claws, there being generally present three such spines on the first segment, and one special one on the following (Pl. LXIV. f. 5). In most cases the long spines are accompanied by some small ones, generally placed near the base of the segment. Such claws as these are commonly found in *Acherontiinae*, accompanying other modifications (reduction of mouth-parts, spinosity of tibiae, etc.); they are wholly absent from all other *Sphingidae* except *Choerocampinae*, where they occur occasionally in a lesser degree of development.

Another modification obtains in *Cocytius*. In this genus of *Acherontiinae*, especially in the males, the fourth row of the foretarsal segments resembles a short-toothed comb or rake, the spines standing rather close together and being directed ventrad and somewhat curved (Pl. LXIV. f. 6). The spines of the other rows have, in some species, disappeared for the greater part (Pl. LXIV. f. 10).

The foretarsal spines of *Cephonodes* are mostly reduced to hairs.

The midtarsal spines have also their specialisation. Here it is the fourth row. The basal spines of this are prolonged to long bristles (Pl. LXIV. f. 7), forming the midtarsal comb alluded to very frequently in the body of this Revision. The comb is very strongly developed in *Cocytius*, *Protoparce*, and other *Acherontiinae*, and gradually disappears (as a comb) in the weaker members of the subfamily, the bristles assuming the normal length. In *Ambulicinae* it is not met with, not even in forms with such long legs as are

possessed by *Campsogene* and *Protambulyx*. Here the corresponding spines are slightly thinner than the more distal ones, but very little longer, the most basal ones being even shorter than these. The comb occurs again in the *Sphingidae semanophorae*, especially in the lower forms ; but the bristles never attain the length they have in *Acherontiinae*, resembling always more ordinary spines and becoming gradually shorter (Pl. LXIV. p. 8). It will be noticed in the figure quoted that the third row of spines does not reach the base of the segment.

The hindtarsus is generally longer than the midtarsus, but agrees with it in appearance. The comb, however, is less strongly developed, and is not part of the **fourth** but of the **third** row of spines, which is very strange, and, like all strange things in morphology, very interesting. The combs of mid- and hindtarsus serve doubtless both the same purpose—we think, of keeping the abdominal fringe of the wing in order, and, in the ♂♂, perhaps also to brush the tuft of the abdominal scent-organ. As the hindtarsus is in a different position to the body and wings, the position of the comb has become altered, or, rather, another row of spines has developed into a comb. As the four ventral rows of spines of the three tarsi are homologous organs, and as the comb of the hindtarsus is homologous to the third row of spines of the midtarsus, we see clearly that the appearance of the comb on the hindtarsus is not due to an inner factor of development causing the comb of the midtarsus, developed for some purpose, to be repeated on the hindtarsus. It must have been an extraneous factor—*i.e.* adaptation—which was the cause of the development of the same kind of organ from different sources.

The second and fourth rows of spines of the first segment of the hindtarsus, or only the fourth, do not reach the base.

The fifth segment of all tarsi bears some stout and pale sensory hairs at the end on each side close to the apical spine, forming often a brush. There are two long bristles dorsally close to the edge, curving ventrad (Pl. LXIV. f. 9—15). In a few instances the number of bristles is larger in some individuals, there being occasionally as many as four or five ; but this is quite an exception. The pair of bristles is normal not only for the *Sphingidae*, but also for a number of other families. In Butterflies and Skippers we find from four to ten bristles ; in *Sphingidae*, *Noctuidae*, *Notodontidae*, *Lasiocampidae*, etc., there are two ; while the bristles are absent or vestigial in *Pyralidae*, *Zygaenidae*, *Aegeriidae*, *Hepialidae*, *Tineidae*, etc. The character is of taxonomic value. *Thyrididae* with two bristles and *Pyralidae* without them can thus readily be distinguished. In *Saturniidae* and *Uraniidae* the two large bristles are generally accompanied by several smaller ones.

The claw-segment is one of the most interesting organs of insects, on account of its very numerous modifications. It does not seem to us to have been made use of in systematic works on *Heteroecra*. The elements of which it is composed are the claw (*onychium*), the false claw (*paronychium*), the pad (*pulcillus*), and the *empodium*.

The empodium is in Lepidoptera a small tubercle above the pad between the claws, bearing one bristle, seldom two. It is widely distributed among the pad-bearing species, but is seldom found in *Sphingidae* (*Sphingulus; Hopliocnema*). The claws are simple in *Sphingidae*, not divided or toothed ; they are dilated at the base (Pl. XLIV.) The pulvillus (*pulv*) varies much in size in Lepidoptera, and is often absent, the presence or absence frequently characterising genera and whole subfamilies, but forming not rarely a distinction only of specific value. Absence of the pulvillus is of common occurrence among *Acherontiinae* and *Ambulicinae* ; while the organ is very seldom obliterated in the other subfamilies, *Arctonotus* and *Euproserpinus* being the only instances. The paronychium (*par*) is membranaceous, ventral and lateral in position, finely ciliated on the surface, and provided with a more or less long fringe at the edges. Its special shape varies much in insects. It is generally deeply sinuate mesially, and each half may be again divided (or perhaps produced) into two lobes. The paronychium of *Sphingidae* possesses in its most generalised state two slender lobes on each side (Pl. XLIV. f. 9. 10), of which the upper (or lateral) lobe is generally the longer, very rarely the shorter one. The reduction of the paronychium begins with the ventral lobe (Pl. LXIV. f. 11. 12) ; this is **always** the first to disappear, there being no Hawk Moths which possess the ventral lobe and are devoid of the lateral one. The remaining lobe becomes also gradually shortened, and disappears too, the paronychium then being represented by a small ciliated membrane, which is often less distinct than in f. 14. 15 of Pl. LXIV. The reduction and, practically, obliteration of the paronychium occur very often in *Acherontiinae* and *Ambulicinae*, rarely in the other subfamilies. The difference in the paronychium is often employed by us in the definition of genera. However, there are genera (*Hyloicus*) in which the absence or presence of a paronychial lobe indicates only specific distinctness, and sometimes not even that. *Hyloicus perelegans* consists of a black-backed and a grey-backed form, which are found in the same country, and are most likely seasonal forms. The black-backed form possesses, like most other *Hyloicus*, a long lateral lobe (Pl. XLIV. f. 13), which is represented in the grey-backed form by a short triangular flap (Pl. LXIV. f. 14. 15). This difference within the same species is of considerable significance. The case teaches us distinctly that the same kind of character is by no means everywhere of the same taxonomic value. No morphological character is *a priori* of specific or generic value or indicates a higher category than genus. The taxonomic value of a character has to be studied in each group of species ; a difference which is insignificant here may be very important there.

The reduction of the claw-segment—or, rather, of the paronychium and pad, for the claws never disappear, nor do they lose the ordinary shape—begins in *Sphingidae* with the obliteration of the paronychial lobe. From this second stage lead two paths to the abolition of the pulvillus and paronychium. The ordinary path is that on which the third stage is represented by a segment without (or with strongly reduced) pulvillus, and with well-developed lateral paronychial lobe ; while the fourth stage is attained when this lobe has also

disappeared. We meet with this development, which is illustrated on Pl. LXIV. by figs. 9—15, in *Acherontiinae* and in *Ambulicinae*, also in the other subfamilies, but here less often. The intermediate stages are numerous; but these are generally of little systematic importance, as it is scarcely possible to distinguish diagnostically, for instance, between a long and a moderately long lobe. However, intermediate stages in the development of the claw-segment are often wanting between one species and its nearest ally, or between one genus and the next.

The second line of development is represented by the two closely allied genera *Kentrochrysalis* and *Sphingulus*. The former possesses a complete paronychium and a pulvillus; the latter genus has only a pulvillus. Here the paronychium has disappeared before the pulvillus. The intermediate stage between the two genera is not known; in this the paronychium would have one lobe. Nor is the fourth stage without pulvillus, the one following *Sphingulus*, as yet known. The fact of the pulvillus having been preserved in *Sphingulus* and the paronychium lost is important. Such an exception from the general rule demonstrates that an external cause determined which of the possible lines of development that single species out of many had to follow. A similar development occurs among the *Ambulicinae*.

The scaling of the tarsus and tibia is sometimes a distinguishing character of genera. As a rule the mid- and hindtibiae appear strongly compressed, owing to the scaling being longer above and below than on the sides. The scaling between and near the spurs is mostly long and tuft-like, and so is that ventrally at the base of the first mid- and hindtarsal segments. In *Pachygonia* the proximal segments of the hindtarsus appear triangularly dilated, owing to a high crest of scales. The mid- and hindtarsi of *Macroglossum* and some other genera are compressed, especially the first segment, which has become strongly asymmetrical, its first inner row of spines being ventral, while the first outer row is almost subdorsal.

The singularly meagre success attained in the definition of genera of *Sphingidae* by the authors of the old school—meagre even from their point of view—was mainly due to the wings seldom offering in the neuration such obvious distinctions as are found in other families of Lepidoptera. The neuration is indeed surprisingly constant in the main features, apart from some exceptions like *Cephonodes* with a very short cell to the hindwing, and *Daphnusa* with SC^2 and R^1 of the hindwing on a long stalk. In consequence of this relative constancy, the neuration of a Sphingid can scarcely be confounded with that of species of other families. On the forewing (Pl. LXV. f. 1) we find a five-branched subcosta, SC; the first branch, SC^1, arises between middle and end of cell; SC^2 and SC^3 are on a long common stalk branching off before the upper angle of the cell; from this stalk SC^2 turns towards the costal margin not far from the tip of SC^3. In very many species, or in many individuals, SC^2 is not present at all, it being generally either very weak or absent; the vein is of no constancy whatever, and consequently of no taxonomic value within the family. SC^4 ends in the distal margin just below the tip of the wing, and joins here sometimes

SC^3 (*Macroglossum; Sesia;* etc.); SC^4 and SC^5 are on a stalk, and separate at about one-fourth the way from the cell to the apex of the wing (*subcostal fork*). The radial vein, R, has the three branches situated as follows: R^1 at the upper angle of the cell or from the stalk SC^{4+5}, but never standing far from the angle of the cell: R^2 nearer R^3 than R^1, but never at the lower angle of the cell, sometimes central. Of the two branches of the median vein, M, the proximal one, M^2, arises mostly before or in the middle of the cell, seldom beyond; and M^1 stands proximally of the lower angle of the cell, which it approaches sometimes without reaching it. SM^1 is absent; it will be found designated as (SM^1) in the descriptions of this Revision. SM^2 is supported basally by a remnant of SM^3, the two forming a fork; SM^3 is rather long, disappearing generally in SM^2 at a point where the wing is about as broad as SM^3 is long. The fork is mostly distinct, but in *Macroglossum* and some allied genera SM^3 is so close to SM^2 and is so weak that one can scarcely speak of a fork; while in other genera (*Marumba*, for instance) the fork is very obvious. The cross-vein D^2 between R^1 and R^2 is very oblique; D^3 is mostly somewhat curved; D^4 is a direct continuation of M. The costal vein of the hindwing ends costally of that point of the wing which is farthest from the base; it follows on the whole the curve of the costal margin, and is accordingly bent backwards and again forwards in *Degmaptera* with sinuate and lobed costal edge. The first branch of the submedian vein is generally designated as the "bar," connecting SC with C; it is the vein forming together with C the small subbasal cell of Butterflies. This bar or SC^1 branches off in or before the middle of the cell; in the latter case it is mostly weak and long (*Macroglossum*, for instance). SC^2 and R^1 are generally on a short stalk, seldom on a long one, or come from a point or are slightly separate. R^2 varies much in position; it is more or less central, standing sometimes nearer the upper angle of the cell, sometimes nearer the lower one. R^3 comes from the lower angle of the cell, and is nearly stalked with M^1, this vein arising in all genera, except *Cephonodes*, from before the angle. Its position is occasionally constant within a genus or a species, and different from that which it occupies in the next. M^2 stands mostly beyond the middle of the cell, approaching M^1 occasionally. The first submedian vein is absent as on the forewing; SM^2 and SM^3 are present. The cross-vein D^2 between R^1 and R^2 is transverse or oblique, straight or curved; D^3 is mostly oblique, seldom transverse; while D^1 appears as prolongation of M. When D^3 is transverse, the lower angle of the cell is 90 or obtuse (*Amphion; Orecta; Rhodoprasina; Cypa; Lycosphingia;* etc.).

The frenulum and retinaculum are present in all generalised forms. There exist, however, quite a number of genera in which they are reduced, vestigial, or absent. Such genera are found only among the *Acherontiinae* and *Ambulicinae* (= *Sphingidae asemanophorae*), which therefore may be called frenulum losers. The frenulum is especially often lost in slow-flying species, or such species as have a tumbling flight like Butterflies, and not the darting flight of the greater portion of the *Sphingidae*. The wings of the frenulum losers are generally

broad and often leaf-shaped. However, the breadth of the hindwing or the dilatation of the costal margin of the hindwing is not the cause of the loss of the frenulum. The absence of the frenulum and the weak power of flight are the result of the same tendency to retrogressive development, but they are not dependent on one another. There are quite a number of *Sphingidae* with broad wings and heavy body (*Marumba* and *Lophostethus*, for instance), and such with strongly dilated costal area of the hindwing (*Stolidoptera*, *Hypaedalia*), which have preserved the frenulum. The reduction of the wing-power, the modification of the shape of the wings, and the loss of the frenulum and retinaculum occurring together is to be understood in the same sense as the occurrence of such wing-characters as those together with reduced mouth-parts, for instance.

The glossy patch of modified scales found on the underside of the forewing near the base before the hinder margin does not extend beyond SM^2 and stops generally at SM^3. It is elongate and more or less pointed distally behind SM^2. The scales of the patch are broadly rounded at the end, entire (not dentate), sometimes subtruncate, often somewhat asymmetrical, and never elongate-pointed. The non-scaled area which is found, for instance in *Notodontidae*, within this patch or proximally of it, and which is covered with fine short hairs, is not met with in *Sphingidae*. In front of the patch of scales just described there is another, separated from it by hair-scales. This patch is not distinct in all species, but sometimes rather conspicuous—for instance in *Herse convolvuli* and *Pholus labruscae*. It is situated behind M, extending occasionally into the cell, and consists of entire, more or less lanceolate scales, which are often directed obliquely costad.

The glossy and sharply defined basal costal patch on the upperside of the hindwing is composed of scales similar to those of the corresponding patch of the forewing.

The generalised forewing of the *Sphingidae* is elongate-triangular in shape, about $2\frac{1}{2}$ times as long as broad, with the apex acute, the hinder (or anal) angle distinct, the outer (or distal) margin entire and shorter than the hinder (or inner or abdominal) margin, and the latter slightly convex proximally and slightly concave distally. Departures from this type are very numerous. There occur triangular entire wings which are three times as long as broad, and others (rarely) in which the distal margin is as long as or longer than the hinder margin. The opposite development results in a short and broad "bombycine" wing similar to that of broad-winged Notodonts or Lasiocampids, with obtuse apex, a form which is found in a number of *Acherontiinae* (*Lapara*, *Hopliocnema*, etc.) and *Ambulicinae* (several *Polyptychus*, Pl. I. f. 10. 11), which have lost the typically Sphingid aspect. The apex is sometimes produced into a hook (*Lycosphingia*), and the hinder angle is often very obtuse, in one case completely rounded (*Phylloxiphia*, Pl. I. f. 4), and produced backwards in the rather numerous species with more deeply sinuate hinder margin (Pl. I. f. 5. 6. 9). The distal margin is entire, concave, straight, or convex, bisinuate, dentate, scalloped, or strongly lobed. The irregular distal margin does not

occur in *Acherontiinae*, and is rarely met with in *Chocrocampinae* (*Phanoxyla hystrix*); among the other subfamilies this form of wing is often found. The lobe at R^3 is generally the most prominent; but this rule does not hold good in every case—in *Pseudenyo*, for instance, there is no distinct lobe at R^3, but a prominent lobe at R^2.

The hindwing is scarcely less variable within the family than the forewing. The apical angle, the point farthest from the base, lies at SM^2 or (rarely) at R^1; the anal angle at SM^2. The distal margin is less irregular than that of the forewing in the lobate species—as a rule convex, sinuate before anal angle or not; the apex is very often completely rounded (Pl. I. f. 5. 6. 8. 10 11. 12). The costal margin, ordinarily straight proximally and slightly convex distally, undergoes very conspicuous modifications. It is dilated into a proximal lobe (*Macroglossum aquila*: *Gigantcopalpus*: *Aleuron*); or the costal area before vein C is widened and, when the insect is at rest, overlaps the forewing, recurving and enveloping the costal margin of the latter (*Stolidoptera* and *Hypaedalia*): or the costal margin is dilated distally, and either sinuate proximally of the lobe or not (*Degmaptera*); or it is dilated proximally and distally and sinuate between the lobes (*Gurelca*).

Though the opinion to which Butler gave expression in 1875, that an obvious difference in the shape of the wing is a generic difference in this family, is not correct in its entirety, the wings of close allies and of the sexes being sometimes very different (Pl. I. f. 1, ♂; 2, ♀), a special wing-form is, however, in many cases accompanied by other distinguishing characters, and restricted with these to an assemblage of allied species constituting a genus. In such cases the shape of the wing is a very convenient character to recognise a genus by, or to be used in a key. *Protambulyx* (Pl. I. f. 3) and *Oxyambulyx* (Pl. I. f. 2) illustrate this point, all the species of the former genus and its close ally *Amplypterus*, which two genera are purely American, having the apex of the forewing truncate-sinuate, while all the species of the purely Oriental genus *Oxyambulyx* have the apex acute. *Oxyambulyx* and *Protambulyx* can, therefore, easily be distinguished by the shape of the wing. However, this distinction alone would not justify us in treating the insects referred to as generically different; the justification lies in the whole organisation of the species proving them to belong to two sharply defined groups, each containing material which is *inter se* more closely related than with the members of the other group.

The **abdomen** of Lepidoptera is composed of ten segments. The ninth and tenth of the ♂ and the eighth to tenth of the ♀ are modified, so that the last one of ordinary appearance—the last of descriptive Lepidopterology—is the eighth in the ♂ and the seventh in the ♀. The first segment is short and generally overlooked in ordinary descriptive work; it has no free sternite, and the tergite lies often close against the thorax (Pl. LXIII. f. 1. 2).

The base of the abdomen of a number of families of Moths exhibits very distinctive features, here being found organs of various kinds, most likely all

of a sensory character, the metanotum occasionally taking part in the peculiar structures. The *Sphingidae* have nothing of the kind, but possess other specialisations in the abdomen, of which an armature consisting of spines is the most notable one. The spines stand at the edges of the segments, and are found on segments 2 to 8 in the ♂ and 2 to 7 in the ♀. The dorsal spines are stronger than the ventral ones ; the latter are often very weak, while the former are strong ; or the ventral ones are only vestigial or are absent, while the dorsal ones are numerous. The longest spines are on the seventh tergite. We find three main types, illustrated by Pl. LXII. f. 9. 10. 11.

The most frequent type is represented by f. 10. Here we have several rows of elongate, flattened spines, those of the proximal row being (as is always the case) the shortest, and those of the last row the longest, so that the upper ones cover the next only partly. The spines of this type vary in the different species (resp. genera) from being very strong (*Phryxus lineata ; Atemnora*) to being very weak, disappearing in some *Ambulicinae* altogether, or rather developing all into scales (*Lycosphingia ; Cressonia ; Langia*). Where the spines are weak, the skeleton of the segments is also weak. The reduction in the degree of chitinisation of the spines is generally accompanied by a decrease in size, and often by an increase in number. In some instances weak spines are distributed all over the tergites, this being due to the scales of the under layer having become spiniform (*Ambulicinae ; Maruмba ; Clanis ;* etc.). Where the spines are longer, more conical, and more strongly chitinised, their number is generally smaller (*Cocytius*, for instance). This variable type is found in all subfamilies, the strongest reduction of the spines occurring in *Acherontiinae* and *Ambulicinae*.

In the second type, represented by Pl. LXII. f. 11 the spines are similar to those of the strongly chitinised form of the first type, except in the spines of the first row being short and rounded. The spines are all flat, black and glossy, being very strongly chitinised. The type is very constant in itself, and there are no intergradations between it and the preceding, except on the proximal sternites. This kind of spination makes the abdomen smooth and slippery, the spines lying very closely upon the following segment. The spines of the sternites are the same as those of the tergites, only the proximal ones of the proximal sternites being a little longer. The type is confined to *Sesia* and allies and *Macroglossum* and allies—*i.e.* to the most specialised genera of *Sesiinae* and *Philampelinae*. The basal sternite (= sternite of second segment) is spinose in the species with this type of spination (Pl. LXIII. f. 2).

In the third type, which is connected by intergradations with the first, there is only one series of spines (Pl. LXII. f. 9), which stand often well apart, and are long, conical, and very strong. The form of this type without any small spines occurs only on the last tergites ; on the more proximal tergites and on the posterior sternites smaller spines appear between the long ones, while on the basal segments the spines are all short and flat, the uniserial

arrangement, however, being preserved. The uniserial spination is found only in *Pseudosphinx* and allies, *Pachylia* and allies, a number of *Xylophanes*, and in *Pholus*—*i.e.* in generalised forms of the *Sphingidae semanophorae*.

The second type of spination has arisen from the first; there can be no doubt on this point, if one compares *Ptemnora* and *Macroglossum*, and the members of the *Sesia* series of genera: it represents the highest specialisation in one direction. Which, however, is the original spination of *Sphingidae*? Does the weak spination of the higher *Imbulicinae* and *Acherontiinae* represent the generalised state, or is a stronger chitinised type more ancestral?

There is a complete gradation from *Cressonia*, *Langia*, etc., without spination, through the reduced *Sphingidae* with weak spines, to the strong uniserial spination of *Pholus*, *Pseudosphinx*, etc. Spination is certainly a specialisation. It is restricted to the *Sphingidae*, the only approach to spination we know of being found in the American *Castniidae*. Therefore one cannot seriously doubt that the ancestral Heteroceron from which the family *Sphingidae* has arisen was a Lepidopteron without abdominal spination. But was the abdomen of the early Sphingid also spineless? or was the acquisition of spination among the first specialisations by which the early Sphingid deviated from its allies? Where there is a series of quantitative gradations from *a* to *z*, the student is easily inclined to consider *a* the beginning and *z* the end of the development. The presence of such a series is, however, no proof whatever that the quantitatively lowest degree is the pylogenetically oldest stage. The mistake has been made, and will often be repeated no doubt. It is a very natural and very convenient conclusion. If this view were correct in our case, the Hawk Moths most generalised in spination would be the few species which have no spines (*Cressonia juglandis*, *Langia zenzeroides* and *Lycosphingia hamatus*), and next would come a great mass of genera with weak spines. All these weakly spined Hawk Moths are weak also in other respects; they are reduced and otherwise modified forms, showing reduction and modification in the mouth-parts, scaling, legs, wings, and sexual armature; they are decidedly developments from less reduced types. It is true, a specialised insect may have preserved one or more generalised characters; but it would be very singular, —and is surely improbable—if such a number of species of various subfamilies had all preserved the same ancestral spination, and become in other respects so diversely modified. On the contrary, one is bound to conclude that the probability is altogether in favour of the weak spination being also a character acquired—*i.e.* that the weak spination is the result of the reduction of a stronger spination, as the short tongue, the short antennal end-segment, the small palpus, the short spurs, etc., etc., are the results of reduction.

The first abdominal segment (*at*^{1} and *pp*, Pl. LXII. f. 6. 8; Pl. LXIII. f. 1) consists of a tergite (*at*^{1}) and a more or less triangular lateral plate, the paraplenra (*pp*). The tergite varies much in length, and offers distinguishing characters, being, for instance, reduced to a very narrow stripe in *Macroglossum* and allies, while it is about half the length of the second tergite in *Haemorrhagia*,

Sesia, etc. There is no trace of real spines on the first tergite, or on the parapleurae. The latter are always simple, flat, not raised in front to a flap; in short, there is nothing recalling the special structures of some other Heterocerous families. In front of the parapleura we find the first abdominal stigma (*sti*); it lies free in the membrane. The stigma of the species in which the abdomen is pressed closely against the breast is not visible without separating the abdomen from the metanotum. The second to sixth tergites are essentially of the same structure, the spines of the posterior ones becoming stronger, however, as said above. The seventh tergite is longer, with the sides more strongly converging anad in most species; it has a quadrangular shape in *Sesia*, *Macroglossum*, etc., or becomes more or less conical or elongate-trapeziform (most genera). The eighth tergite is small, and partly (♂) or completely (♀) concealed by the seventh. This segment will be described below. The parapleurae of segments 2 to 8 are membranaceous and bear the stigmata. The second stigma, however, is situated upon the tergite (Pl. LXIII. f. 1), and the third one half upon the tergite and half upon the parapleura. The eighth segment and following have no stigmata.

The sternite of the first segment is absent, or perhaps vestigial and merged together with that of the second. In the special part of this Revision we understand under second, third, etc., sternite, the sternite of the second, third, etc., segment. In *Sphingidae*, as well as other families, the structure and shape of the sternites of the first and last segments require special attention, as they undergo sometimes remarkable modifications. The second (= basal) sternite of *Sphingidae* touches the merum of the hindcoxa, with which it is connected by a short membrane. In by far the larger number of species it is slanting (Pl. LXIII. f. 1), transversely impressed in front, the impression ending at each side in a small but often deep groove, and is mesially carinate in front, the carina fitting in between the coxae. The sternite of *Macroglossum* differs from the normal type in the narrower frontal part being vertical, and the main portion of the plate on a level with the following segments and with the posterior trochanters; the low mesial carina is found on the vertical portion of the segment, and the anterior edge of the horizontal portion is smooth and evenly curved. *Haemorrhagia*, *Cephonodes*, and a few allied genera have the frontal part of the segment also vertical, and so incurved that the edge of the horizontal part projects forward. This edge is not simple as in *Macroglossum*, but is mesially produced into a conical obtuse tubercle, which fits in between the posterior pair of trochanters (Pl. LXIII. f. 2; in this figure the interspace between abdomen and coxa is purposely drawn too wide, in order to show the process of the sternite).

The sternite of the seventh segment appears in the **female** sex of *Sphingidae* in two principal types. The ordinary type is that illustrated by Pl. XIX. f. 11 and Pl. LXIII. f. 3 and 4. Here the apical portion of the sternite is more or less broadly membranaceous; the stronger chitinised plate is short, broadly rounded, or sometimes elongate-trapeziform, with the apex faintly sinuate. The

plate is not so sharply limited as it appears to be in the figures. It does **not** bear any spines.

The second type is represented by Pl. LXIII. f. 5 and 6. The membrane connecting the sternite (vii. *s*) with the tergite (vii. *t*) is very small; the sternite is not membranaceous apically, the strongly chitinised plate extending right to the apex. The plate varies in form and size, occupying sometimes the whole ventral side of the segment, the tergite being scarcely visible in a ventral aspect of the abdomen (f. 6); or it is smaller, trapeziform, the tergite encroaching upon the ventral side (f. 5). The apex of the sternite is either totally **spinose** (*Sesia*, *Cephonodes*, etc.), or at least spinose laterally (*Pachygonia*). This type is a derivation from the first.

The seventh sternite of the male of *Sphingidae* is normal, being similar to that of the sixth. The eighth sternite, however, is modified; it is always without spines, deeply sinuate as a rule, and occasionally incrassate mesially or produced into a process (Pl. XXII. f. 18—29). In the *Sesiinae* and *Philampelinae* with a stumpy abdomen (*Sesia*, *Pachygonia*, *Macroglossum*, etc.) it is very short. The eighth tergite of the male is spinose. It varies in size and shape like the seventh. It is long, and appears conical in dorsal aspect in *Acherontiinae*, for instance, and short and flat in *Macroglossum*, *Sesia*, and allies.

The abdomen taken as a whole is mostly elongate-conical. Deviations from this form, which represents the generalised type, are numerous. We mention that the abdomen is ovate in some *Haemorrhagia*, flat and broad in *Hypaedalia*, broad and stumpy in *Pachygonia*; that it is horizontal in most species, and curved upwards in many *Ambulicinae* and some *Acherontiinae*.

The scaling of the posterior segments exhibits sometimes striking features. The scales at the ventral apical angles are occasionally prolonged to tufts (many *Sesiinae* and *Philampelinae*: *Oxyambulyx*; *Poliana*; etc.). The long scales of the seventh and eighth segments form tufts especially liable to modifications. In *Pachygonia* the abdomen is triangularly truncate with a short lateral tuft; this tuft is prolonged in *Himantoides*, the "tail" appearing divided. The expansible fan-tail found in numerous *Sesiinae* and *Nephelicae* is generally tripartite; it occurs also in *Cypa* and allies, of the subfamily *Ambulicinae*. The modification in the skeleton of the fan-tail segments consists in the plates being short and amply movable. There is no additional division of the segments besides the separation into a tergal and a sternal plate. We have not studied the muscular apparatus.

The modifications of the scaling of the abdomen are very instructive. The upper scales are generally elongate, more or less hair-like in appearance, and the underscales large, multidentate. Among the *Sphingidae asemanophorae* we find a good number of forms which have instead of the broad underscales long hair-like ones, which are often modified into lanceolate spines resembling the weak spines at the apices of the segments in the respective species. Kellogg drew the conclusion, from his studies of the scales of Lepidoptera, that the hair-like scales represented an older type than the broad multidentate scales.

We have arrived at the opposite opinion. The shagginess of the scaling of *Haemorrhagia*, many *Ambulicinae*, and *Acherontiinae* is a specialisation derived from the more smooth scaling preserved by the majority of *Sphingidae*. We find shagginess only in also otherwise much specialised forms. Roughness of the scaling and development of broad scales into long ones accompany nearly always the retrogressive development of other organs.

The **copulatory apparatus** of the male is composed of the ninth and tenth segments, in some cases also the eighth segment taking part in the formation of the apparatus. The accompanying diagram (Fig. 3) will make clear the relative position of the various elements of the clasping-organs.

The ninth segment is a strongly chitinised girdle, broadest above, and here sinuate basally (Pl. XLII. f. 2. 3. **ix.***t*). This belt is ventro-laterally dilated into a large flap (Cl), the clasper or valve, which corresponds to the pleura and sternite

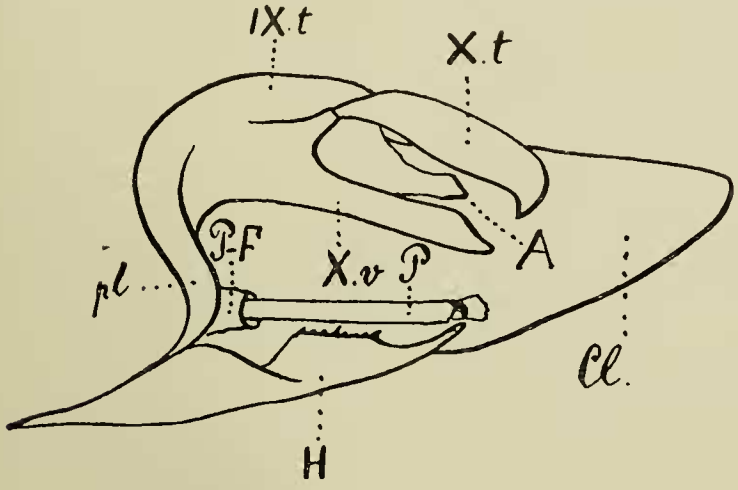


Fig. 3.

of the segment and bears the harpe (*H*), the sternite being divided mesially, as is mostly the case with the ninth sternite of insects. The pleura is attached to a proximal stripe of chitin (Fig. 3, *pl*) and to the sternite. The tenth segment (Fig. 3, *X.t* and *X.v*) stands in very close connection with the ninth ; there is no intersegmental membrane between them, except occasionally a remnant on the upperside. The tenth tergite is strongly chitinised like the ninth segment, while the sternite is occasionally weak. The tenth tergite is movable in a vertical direction, or, if completely divided, also mesiad.

Between the sternite and tergite we find the anus (*A*), and between the tenth sternite and the ninth the penis-funnel (*P-F*), from which protrudes the penis-sheath (*P*).

None of these organs are constant within the whole family of *Sphingidae*. The variety in their structure is enormous. But in spite of the seeming eccentricity in the development, the lines along which modification took place

are here and there plainly visible, and there is not rarely a conspicuous homogeneity preserved in more than one group of species or of genera, and in more than one particular structure, as we shall see by reviewing shortly the mass of specialisations described in the systematic part of the Revision.

The tenth tergite bears stiff hairs, which stand either singly or form a more or less dense covering on the upper and lateral surface. The hairs are generally directed frontad, not anad, and are occasionally so close together that the proximal outline of the tergite cannot be ascertained without removing the covering of hairs. There are two principal forms of the tergite, it being either divided mesially or simple. The symmetrically divided tergite represents the generalised state of the segment. If the two halves are divided down to the junction with the ninth segment, they are a little movable against each other; but as a rule the two processes are not separated proximally, and therefore move together and only vertically (Pl. XXVI. f. 28. 33; Pl. XLII. f. 1—25). We find the divided tergite preserved in some generalised *Acherontiinae*, some *Ambulicinae*, and the *Sesiinae*. It appears in many modifications. From the divided tergite the undivided one has developed in two ways:—

(1) One side of the tergite becomes obliterated, a type which is found only among the *Sesiinae*, and of which we shall have to speak later on.

(2) The tergite becomes narrower, the processes shorter, and the mesial portion correspondingly longer, resulting in a narrow sinuate tergite and then in a non-sinuate one. This is the ordinary type of a simple tenth tergite. Here the single, symmetrical process is generally more or less compressed, convex above, the apex curved downwards to a hook and mostly pointed. The variety in this type is very great, as a look at the figures will show (Pls. XXV., XXVI., XXVII., XLIV., etc.).

The tenth sternite is a belt running from the base of the tergite ventrad, encircling a membranaceous area, from which projects the anal cone, the end of the gut (A). The ventral transverse part of the sternite is in by far the larger proportion of Hawk Moths as strongly chitinised as the vertical side-parts, and produced into one or two processes or lobes of various shapes and sizes. In some cases the transverse portion is very feebly chitinised and does not form a distinctly separate plate (Pl. XXIV. f. 16; Pl. XXV. f. 12. 27); in other species it is a very low ridge without lobe or process (Pl. XXV. f. 1. 24; Pl. XXVI. f. 1). As a rule the sternite is shorter than the tergite. However, in some *Sesiinae* (Pl. XLII. f. 11. 25; Pl. XLIII. f. 1. 4. 5) the reverse is the case. The sternite is simple or divided; it may agree in this respect with the tergite (Pl. XLIII. f. 1), or it may be divided when the tergite is simple (Pl. XXV. f. 20; Pl. XXVI. f. 36), or simple when the tergite is divided (Pl. XXVI. f. 1—14). It is never hairy like the tergite, but the apex is often granulose, the granules bearing fine bristles, most likely of a sensory nature (Pl. XXIII. f. 1. 2. 22). At the inner side of the lateral part of the sternite we find, especially often in *Ambulicinae*, the membrane swollen to a hump beset with sensory hairs (Pl. XXVI. f. 5. 9). An asymmetrical development of the sternite will be referred to below.

The clasper of *Sphingidae* is normally sole-shaped (Pl. XXXVIII. f. 5), with the dorsal and ventral margins rounded. The size is variable. The principal modifications are as follows :—

(1) Modifications by reduction. When only shortened, the clasper assumes the stumpy form as illustrated by Pl. XXXII. f. 18. 19. When only narrowed, we have the narrow clasper of *Callambulyx* (Pl. XXXIV. f. 19. 20), a common type among *Ambulicinae*. The longest and proportionally narrowest clasper is found in *Himantoides* and *Sesia* (Pl. XLVII. f. 1. 15). The broad clasper touches the tenth tergite, while the narrow clasper stands apart from it, if the reduction has taken place in the dorsal portion of the clasper. The interspace between clasper and tenth tergite is then covered by the long fringe of hairs of the former.

(2) Modification by division and the development of a special armature (apart from harpe). Lobes, processes, teeth appear very often in connection with the reduction of the clasper. Compare Pl. XXXII. f. 12. 13 ; Pl. XXXIII. f. 6. 16. 21. 22. 23 ; Pl. XXXIV. f. 3. 28 ; Pl. LI. f. 22 ; Pl. LII. f. 1. 6.

The clasper is not solid, but consists of an external and an internal plate, between which the remnant of the matrix is found. It is an outgrowth from the segment, and can best be likened to the wings. The inner sheath is more or less covered with hairs, which are often very dense, very stiff and long. The hairs of the distal half of the clasper are directed dorso-basad (Pl. XXXVI. f. 9 ; Pl. XXXVII. f. 15). They are not generally drawn in the figures. The inner sheath is in most species raised into special armatures. There is very often a conspicuous subdorsal longitudinal setiferous fold (Pl. XXXVI. f. 18. 19. 20). A dorso-basal ridge or process is commonly found among *Ambulicinae* : it is seldom spiniform (*pdb*, Pl. XXXIII. f. 21 ; Pl. XXXVIII. f. 7), mostly almost membranaceous, compressed and beset at the edges with setiferous tubercles (*pd*, Pl. XXXII. f. 6—11. 15. 17. 18). The ventral armature of the clasper is termed the harpe : it begins at the ventral basal (hollow) incrassation of the clasper, which is the principal part of the sternite proper, and extends more or less distad and dorsad. If the harpe is reduced, the line of separation between the triangular sternite and the main part of the clasper (= pleura) is plainly visible (Pl. XLV. f. 26 ; Pl. XXXI. f. 2 ; Pl. XXXV. f. 20), but as a rule the ridges or processes of which the armature consists are continued over the pleura, the inner sheath of which takes part in building up the structure. The harpe is so diversified that it is impossible to give a general description of this armature. It is on the whole more complicated in the *Sphingidae asemanophorae* than in the *Sphingidae semanophorae*, but we find also among the latter sometimes species with formidable-looking harpes (Pl. XLVIII. f. 17—27). The harpe of *Choerocampinae* is as a rule a simple, slightly curved, slender process (Pl. LII. f. 8) ; an armature of the same type is not rarely met with among *Philampelinae* (Pl. L. f. 32). As a rule the processes of the harpe lie upon the inner surface of the clasper : but occasionally the sternal part alone forms the armature, and is situated below the main part of the

clasper (Pl. XXXIII. f. 1. 14; Pl. XXXIV. f. 6). In by far the greater number of species the harpe is shorter than the clasper. A dense patch of scales is found on the harpe of nearly all *Protoparce* and in many other *Acherontiinae*.

The right and left clasper and harpe are generally the same in outline and structure. However, there are exceptions, asymmetrical development occurring also in these organs, as will be detailed below.

The external plate of the clasper is divided by a longitudinal rib-like incrassation into a narrow dorsal and a large ventral portion. The dorsal part is generally concave above the rib. Upon and near the rib there is a peculiar modification of the scaling found in a great number of *Sphingidae*. We consider it an organ of friction, by means of which a sound of some kind is produced. We do not know whether a similar organ occurs anywhere else among Lepidoptera. There are two types of this organ, the one confined to the *Sphingidae asemanophorae*, the other to the *Sphingidae semanophorae*.

In the former group of *Sphingidae* it is a patch of scales lying more or less flat upon the clasper (Pl. LVIII. f. 29—32). The patch as well as the scales vary in the different species (respectively genera) in shape and size. The patch is as a rule restricted—being, for instance, narrowly halfmoon-shaped in *Protambulyx strigilis* (Pl. LVIII. f. 30), triangular in *Protambulyx eurycles* (Pl. LVIII. f. 32). But in some cases it is very large—*Amplypterus* (Pl. LVIII. f. 29). The scales of the patch are rounded and entire, or elongate and dentate (Pl. LVIII. f. 35); the middle ones are half erect in *Poliana buchholzi* and *micra*. A peculiar modification obtains in *Polyptychus triseeta* and *P. orthographus* (pp. 243. 244). Here the scales are obliterated for the greater part, the dorsal area of the clasper being naked and rough with some granules.

The friction-organ of the *Sphingidae semanophorae* consists of lanceolate scales which are half erect. The scales are very numerous and small (Pl. LVIII. f. 36), or are reduced in number and have increased in size (Pl. LVIII. f. 37), the smallest number, namely **one**, being found in *Hippotion rebeli* and *isis*. The scales are strongly striped, have generally a prominent midrib, and are more or less obviously asymmetrical (Pl. LVIII. f. 38); they are more often truncate than pointed. In *Oryba kadeni* (Pl. XLVI. f. 4) the organ is entirely different, consisting of a large mass of long, wire-like, brittle hairs.

Among the *Ambulicinae* with friction-patch on the clasper we find a number of species which possess a corresponding organ of scales on the inner side of the eighth tergite. This organ is almost confined to the *Ambulicinae*, being found elsewhere only in some *Acherontiinae*, not in any *Sphingidae semanophorae*. The organ consists of one single row of large scales, or of several rows. The scales are ribbed, and are so closely applied to each other, or are even soldered together, that they form a kind of ribbon at the apical and lateral edge of the tergite, the flat ends of the ribbon being directed towards the clasper. This ribbon is either continuous from one side to the other (Pl. LIX. f. 1), or it is interrupted apically (Pl. LVIII. f. 39. 40; Pl. LIX. f. 2). The scales of the

ribbon are homologous to the undermost scales of the tergite, which stand in other species at the very edge of the segment, and are also here often turned internad. The organ is as a rule visible without dissection, but has as yet escaped observation, as has also the friction-patch of the clasper. There can be no doubt that the ribbon of the eighth tergite and the patch on the clasper form together one (stridulating) apparatus.

Is the friction-patch a new acquisition, or have the species which are without it lost this organ? In the *Sphingidae asemanophorae* the organ is found in the more generalised forms and never in the strongly specialised (reduced) species. In the *Sphingidae semanophorae* the organ is absent from many of the most specialised genera; it consists of a multitude of small scales in several generalised genera (*Pholus*, for instance), and its development culminates in some *Hippotion* with one large scale. From these facts we conclude that the ancestral Sphingid possessed a friction-patch which consisted of numerous small scales not very different from the ordinary scaling of the clasper, a patch perhaps similar to that of *Pholus* and *Pseudosphinx* (Pl. LVIII. f. 36). From this indifferent patch the two modifications arose,—in the one type the scales remaining numerous and becoming closely packed together, as in *Psilogramma*, *Meganoton*, *Protambulyx*, etc.; in the second type the central scales becoming enlarged and seriated, and assuming a half-erect position, with the broad sides turned more or less dorsad and ventrad, as in *Nephele*, *Deilephila*, *Theretra*, etc. In the *Sphingidae semanophorae*, where retrogressive development is comparatively rare, the friction-scales are found in the greater number of species. They are lost in the reduced or otherwise strongly specialised forms like *Sphingonaepiopsis*, *Proserpinus*, etc.; they are also absent from modified claspers like those of *Haemorrhagia*, *Perigonia*, etc. Among the *Sphingidae asemanophorae* the friction-patch is comparatively less frequent. Of *Acherontiinae* only Old World genera have preserved it, not one of the numerous American species possessing the organ, while a large proportion of Old and New World *Ambulicinae* are provided with it.

The area between the two claspers and the tenth sternite is more or less membranaceous. There is a central hole, of which the edges are more or less raised and chitinised, forming what we have termed* a penis-funnel (Fig. 3, *P-F*). This penis-funnel (*P-F*, Pl. XXIX. f. 38. 39. 47; Pl. XXX. f. 41; Pl. LI. f. 17—25) is vestigial or distinct; it has often a special shape, and has an armature of its own which is of great help in the discrimination of species in more than one case (see *Nyceryx*, p. 414, Pl. LIII. f. 44—48; compare also Pl. XXX. f. 33—38; Pl. LIII. f. 13. 14). Above the penis-funnel there is in a few cases a further armature consisting of a pair of processes, one on each side (*n*, Pl. XXV. f. 2).

From the penis-funnel projects the penis-sheath, of which the former is a support. The penis-sheath is provided at the end, or near it, with processes and teeth of various shapes and sizes, this armature being as diversified as that

* *Nov. Zool.* v. p. 561 (1898).

of the clasper. The processes are either firmly connected with the sheath, of which they are an outgrowth or a prolongation (Pl. XXX. f. 22. 48), or they are more or less movable against the sheath, the base of the process at the juncture with the sheath being partly membranaceous, forming a kind of joint (Pl. XXX. f. 31 ; Pl. LIV. f. 1—12). The long and slender whip-like process found in *Perigonia*, *Sesia*, and some allies bears two sensory bristles at the end. We can distinguish two kinds of processes : (1) the process is a prolongation of the apical edge of the sheath, and is accordingly flat or concave on the innerside (Pl. XXIX. f. 9. 12); or (2) the process is an outgrowth from the surface of the sheath, an enlarged tooth, and accordingly more or less conical and hollow, at least at the base (Pl. XXIX. f. 47 ; Pl. XXX. f. 38).

The processes are short or long, single or double, simple or dentate. The most remarkable is that of *E. sagra* (Pl. LIV. f. 13). The teeth on the processes and on the sheath are small or large, single or in patches, irregularly distributed or seriated, forming serrate ridges. They are in most cases solidly connected with the sheath, not breaking off easily. There is, however, a second kind of tooth, which is easily detached from the sheath. This tooth, which has a central and three or four lateral branches, is found in *Theretra latreillei* and allies (Pl. LVIII. f. 4—7). The spine-like teeth of *Xylophanes nechus* (Pl. LVII. f. 18. 19) also break off easily. The same obtains in *centroctena ruther fordi*.

Within the penis-sheath we find the membranaceous penis proper, the duct of the sperma. This duct can be pushed out, and enters the vaginal orifice with the help of the accessory appliances. The duct has in most cases an armature of its own. It is either partly beset with small teeth (Pl. XXIX. f. 34. 41. 42 ; Pl. XXX. f. 12), or the teeth are enlarged to stilettos (Pl. XXIX. f. 40 ; Pl. XXX. f. 44). In other cases we find two or three slightly more strongly chitinised denticulate processes of various lengths and shapes (Pl. XXIX. f. 7. 8. 9. 21 ; Pl. XXX. f. 16—19). Or the love-daggers are strongly chitinised, acute or club-shaped (Pl. LV. f. 44 ; Pl. LVI. f. 41).

The armature of the penis-sheath and penis serves a double purpose. The firm processes and teeth of the penis-sheath are grasping-organs like the harpe. But the processes are often far too long for that purpose alone. Now, the fact that the peculiar dentition of *Theretra latreillei* and allies is easily detached, and the detached teeth are found in the vaginal cavity of the females, makes it evident that the armature of the penis and penis-sheath is a means to stimulate the female, analogous to the apparatus found, for instance, in some Rodents.

The sexual apparatus is of great taxonomic value, and we have taken special care to dissect as many species as we could. In a number of cases the apparatus is the only safe guide in the recognition of species. From this point of view the *Sphingidae* can be divided according to the sexual armature into the following categories :—

(1) Species which are not different from their nearest relatives in these organs. —*Nephele* is an example of this kind. Some *Choerocampinae* allied to *gallii*

and *euphorbiae* also do not show any apparent differences. *Protoparce florestan* and *Chlaenogramma jasminearum*, though generically distinct, have the same sexual armature. This kind of identity should not be confounded with similarity arising out of reduction. It happens that members of different subfamilies become similar in one or the other organ in consequence of the loss of special structures. Such species are, however, never the same in all parts of the copulatory apparatus, as is the case in the insects mentioned before, the list of which is by no means exhausted by the few species used as illustrations to show that it is quite erroneous to maintain that all specifically distinct Lepidoptera exhibit differences in the copulatory organs.

(2) Species which are different from the nearest relatives, but do not show any marked geographical variation in the sexual armature.—Here belongs by far the greater proportion of the Hawk Moths. The specific differences are very slight or very conspicuous, or intermediate in degree. They may be found in one single organ, or in more, or in all. The differences may be slight in some species, and great in others of the same genus. Two species may differ strongly in external features, and little in the sexual armature, or the reverse may be the case. There is every conceivable gradation in this respect. There is always some individual variation, as a matter of course. When examining the armature of only one individual, one is sometimes induced to consider a certain outline or structure as specific, while it is in fact only an individual character; if possible, a number of specimens from different localities should be examined. Individual variation is most obvious in species with complex structures, but it is here far less easily misleading than in the case of simple structures, because the specific differences are as a rule more conspicuous there than here.

(3) Species which differ in the copulatory organ from the allies and vary in themselves geographically.—Geographical variation is most often met with and is most conspicuous in those forms which are sedentary in habits. Sluggish species with functionless mouth-parts and reduced power of flight, species of which the sole function as imagines is propagation, are especially liable to develop into geographical races with differences in the sexual armature. The phenomenon occurs often among *Ambulicinae*. The geographical differences in these organs, which may or may not be accompanied by differences in external features, are occasionally surprisingly great. In *Pseudoclanis postica* from West and East Africa (Pl. XXXII. f. 12. 13), and *Polyptychus trilineatus* from Ceylon, North India, and the Philippines (Pl. XXV. f. 2; Pl. XXXIV. f. 7—10), we have extreme cases of geographical variation in the copulatory organs, which cases are the more instructive as the races exhibit only slight external differences. *Oxyambulyx substrigilis* (Pl. XXX. f. 3. 4. 5) is also an example to the point. It is quite erroneous to say that differences in the sexual armature are always of specific value. Geographical races may be different or not in these organs; and the difference may be minute or conspicuous. It is idle to maintain that geographical representatives are specifically distinct, if the sexual armature shows obvious differences. What one investigator considers obvious

in these organs (as well as in others), a second student does not think worth noticing; and what appears to us to be an insignificant distinction may actually be an accessory character of a very important distinction so far hidden from us. Moreover, even if only quantitatively considered, there is no line of separation between conspicuous and inconspicuous differences; and there being geographical races which are not constantly different, the differences being found only in a larger or smaller proportion of the individuals, there is also no line of separation between geographically separate portions of a species which are different in all individuals and geographically separate portions of a species which are not different. Therefore to say which geographical differences are specific and which not would be entirely dependent, not on the facts, but on the personal view of the investigator. Specific distinctness, however, as we conceive it, is a phenomenon in Nature independent of the student, and therefore independent of all individual opinion. A view of specific distinctness making it dependent on personal opinion must, therefore, necessarily be erroneous.

The taxonomic value of the sexual armature is not confined to subspecies and species. In many cases there are peculiarities in these structures which relate to all the species of a genus, and only to these. Or a group of genera possesses in some or in all members a certain structure not found elsewhere. In fact, the genital organs are very often of great help in locating a genus or a species correctly. We will give some illustrations. The series of genera from *Hemeroplanes*, *Pseudosphinx*, etc., upwards to *Sesia*, *Haemorrhagia*, and *Cephonodes*, has the tenth segment (♂) of the same type; we find here only modifications of one type of anal segment, which do not recur among all the rest of the *Sphingidae semanophorae*. Within this series we find in several genera a very peculiar whip-like penis-sheath (Pl. LIV.), not met with anywhere else. *Nyceryx hypostricta* with this whip will at once be recognised as a relative of *coffeae*, etc., and not of *Protambulyx*, with which it has been associated. The clasper of *Nyceryx* is always different from that of *Perigonia*. The tooth of the penis-sheath of *Protoparce* is always directed towards the right side, of *Cocytius* towards the left. The harpe of *Herse convolvuli* and the other species of the genus is different from that of *Acherontia*, but the harpes of both genera are built up after the same type, confirming the conclusion arrived at from other characters, that *Herse* and *Acherontia* are near relatives. The friction-patch of the clasper consists in *Sphingidae asemanophorae* of a great number of mostly small scales lying more or less flat on the clasper; such patches as represented by Pl. LVIII. f. 29—34 do not occur in the *Sphingidae semanophorae*. On the other hand, this section possesses in many members a friction-organ of large erect lanceolate scales which is not met with among *Sphingidae asemanophorae* (Pl. LVIII. f. 37). The ribbon of friction-scales on the innerside of the eighth tergite is found only in *Ambulicinae* and some *Acherontiinae*. This may suffice to show that the sexual apparatus should not be studied merely with the view of finding differences between species.

The general results arrived at with respect to the male sexual armature

hold good also in the case of the copulatory organs of the female sex, with the exception of the differences being more often insignificant (quantitatively) or apparently absent. This is due to the vaginal armature being on the whole not so strongly chitinised, and therefore offering, where more or less membranaceous, far less obvious differences than in the case of the stronger-chitinised male organs. However, there is an abundance of species, especially among *Sphingidae asemanophorae*, in which the sexual armature of the female presents very striking characters (Pl. XVII. f. 1. 2. 3), and the differences between the species, where these organs are less complicated, become in most instances also apparent when the structures are closely compared.

While the organs of copulation of the male can be dissected from the body without destroying the seventh and eighth segments or cutting off the hinder part of the abdomen, it is necessary to remove the seventh to tenth segments of the female in order to relax them, and then draw them apart, which can be done with the help of a pin. The vaginal armature lying hidden in a cave in most species must be pushed outside by pressure from the inside to become plainly visible.

The ninth and tenth segments are fused into one (*IX* + *X*, Pl. XIX. f. 11. 12) and covered with bristles of various length, which are doubtless sensory in function. Between the two halves of this double segment lies the anus, and ventrally of the anus the aperture of the oviduct. The segment is always short in *Sphingidae*, and there is no ovipositor. The vagina has the same position as in other Lepidoptera—namely, between the seventh and eighth sternites. The vaginal area is more or less sunken between the two segments, but not always—the vaginal orifice of *Cocytius*, for instance, lying on a level with the seventh sternite, and being plainly visible after the removal of some scales. The vaginal orifice is surrounded by more or less obvious folds, ridges, processes, grooves, which are doubtless adapted to the clasping-organs of the male. The orifice is mesial and central, sometimes more proximal, sometimes more distal. In the species with asymmetrical male clasping-organs it is shifted towards the left side (Pl. XLI. f. 1—3). The armature of the vagina is also asymmetrical in *Clanis bicolor* (Pl. XVI. f. 7), of which the male is not known, and in *Hippotion lycetus* (Pl. XLI. f. 17), the male armature of which is symmetrical. It is perhaps necessary to add that the armature is never absolutely symmetrical in either male or female, the two sides differing *inter se* just as much as one individual does from another, and the apex of the penis-sheath being seldom the same right and left.

The vaginal area is generally naked, the scaling being restricted to the more or less completely membranaceous eighth sternite. But in some species the scaling extends into the vaginal cavity (Pl. XXI. f. 12. 15). We find also occasionally species which have the vaginal armature provided with dispersed (sensory ?) hairs (Pl. XX. f. 22).

The part of the vaginal area in front of the orifice is termed in this Revision *antevaginal plate*, and the posterior part *postvaginal plate*.

Besides the vaginal ventral area there is the eighth tergite which forms part of the copulatory apparatus of the female. This tergite, covered by the seventh, is never spinose; it varies in size and shape (Pl. XV. f. 9. 13; Pl. XVI. f. 6. 9—11. 16; Pl. XVII. f. 5—8), and is in many cases different in the species of the same genus, occasionally even in geographical forms of the same species (Pl. XVIII. f. 5. 8). The most remarkable eighth tergites are those represented by Pl. XVII. f. 10 and Pl. XVIII. f. 7. In the former there exists apparently a gland (*o*), from which a groove leads anad to a deep cavity.

The geographical variability of the sexual armature is very instructive for the beginner in the study of comparative morphology. The similarity between the structures of the various subspecies is evident in spite of the differences; the modifications are easy to perceive, and there is no difficulty in recognising the homology. The meaning of evolution and of relationship is very clear when a series of subspecies is compared with one another and with the nearest allied species.

No less instructive is the asymmetrical development of the armature found in a number of *Sphingidae*. From one point of view the asymmetry is even more interesting than the geographical variability. For it is in the case of geographical modifications not rarely impossible to say with certainty which of the modifications is the oldest, while there can be no doubt about the asymmetrical armature being a development from a symmetrical one. Therefore it is easy to make out by comparison of all the allied species which was the ancestral form of the armature. We have here not only the *line* of development, but also the *direction* followed (see p. lxxiv.). Apart from the penis, the armature of which is nearly always asymmetrical, we meet with asymmetry in the claspers and harpe and in the tenth segment of the male. There is outside the *Sesiinae* only one case of obvious asymmetry in the harpe, which occurs in a species of *Polyptychus*, a genus of *Ambulicinae*. In *Polyptychus dentatus* (Pl. XXXIV. f. 6) the harpe has a long ventral process (*pr*); the processes of the right and left harpe are the same in length, and both harpes are quite separate from one another. In a closely allied species, *Polyptychus trilineatus*, a remarkable modification is observed. The ventral processes (*pr*) of the right and left harpe are fused proximally in the Philippine form of *trilineatus* (Pl. XXXIV. f. 7); the process of the right harpe (left in figure) is small and slender as compared with the process of the left harpe. In the North Indian form, *P. trilineatus undatus* (Pl. XXV. f. 2, *pr*), the two processes are fused together to a fishtail-shaped structure, and in the Ceylonese subspecies, *P. trilineatus luteatus* (Pl. XXXIV. f. 10), the process (*pr*) appears as a single asymmetrical one, which does not show a trace of its being the product of the fusion of two processes, except at the base, where the two halves extend upward on each side, surrounding the penis-sheath. This combination of geographical variation and asymmetrical development is very interesting. It will be seen, moreover, from the figures quoted, that the upper, shorter, process (*pm*) of *Polyptychus dentatus* is of different length right and left in *P. trilineatus* (*pdl* and *pdr*).

The tenth segment is apparently always symmetrical in the *Sphingidae* with the exception of *Sesiinae*, where it is asymmetrical in a great number of species. The tenth segment of the *Sesiinae* is normally divided into a right and a left lobe, the tergite (*Xt*) as well as the sternite (*Xr*) (Pl. XLII. f. 1—25). In most species of *Sesiinae* the tergite remains symmetrical; in the highest members of the subfamily it undergoes, however, peculiar modifications. The nearly symmetrical ninth and tenth tergites of *Haemorrhagia* and *Cephonodes* (Pl. XLIII. f. 6. 21) become twisted (Pl. XLIII. f. 8. 11), and the left half finally nearly obliterates, being represented only by a broad semi-detached swelling (*l*) at the base of the right process (left in figures), as shown in f. 15—18 of Pl. XLIII. The sternite of *Haemorrhagia venata* and *Cephonodes janus* has two unequal processes (Pl. XLIII. f. 12. 14. 20); the right one of them disappears, as more fully explained on p. 461, there being scarcely a trace left of it (Pl. XLIII. f. 25, *r*), the sternite having a single process. This ventral process becomes shifted towards the left side in *Cephonodes*, lying finally in a plane with the tergite, and forming with the latter a horizontal forceps (Pl. XLIII. f. 8. 9).

In *Enyo japix* (Pl. XLIV. f. 7) the sternite has become simple, but the left process has not entirely disappeared. In *Himantoides*, also with a simple tenth tergite, the sternite has preserved a remnant of the aborted left process (Pl. XLIV. f. 8), which remnant appears as a tubercle on the left side of the sternite beyond the middle of the latter. The sternite of *Epistor* (Pl. XLIV. f. 10. 11) is simple but asymmetrical at the end; it is doubtless a development from a symmetrically divided sternite, but there is as yet no species known which shows an intermediate stage. In *Calliomma parce* and *Leucorhampha ornatus* the left process of the sternite is shorter than the right one, while in *Pachylia resumens* (Pl. XLII. f. 6) the right one is a little longer than the left. In all these cases the sternite is in advance of the tergite in the asymmetrical reduction.

The right and left harpes are conspicuously different in several *Sesiinae*. *Pachylia darceta* (Pl. XLV. f. 26. 27) has on the left harpe a large curved process, which is represented on the right harpe by a small tooth only. In *Aleuron neglectum* and *Epistor lugubris* we find the right harpe produced into a long conical, elbowed process (Pl. XLVI. f. 13), while the left harpe is very short (Pl. XLVI. f. 12). Differences which are not quite so conspicuous are observed in the allied species and genera. Sometimes the claspers are obviously different right and left—as, for instance, in some *Epistor*. The most remarkable cases are again found in the genera *Haemorrhagia* and *Cephonodes*. The latter genus has no free harpes; the right and left claspers are always different in size and shape (Pl. LI. f. 22—25; Pl. LII. f. 1—3), the contrast being strongest in *C. trochilus*. In all *Cephonodes*, as well as in all *Haemorrhagia*, the left (right in figures) clasper is reduced or modified. The right and left harpes of *Haemorrhagia venata* are practically the same (Pl. LII. f. 5); in the other species the left is always shorter than the right, the latter being often long and club-shaped, whereas the left one is vestigial (Pl. LI. f. 17—21; Pl. LII. f. 4).

Asymmetry is also observed in the armature of the penis-funnel—for instance, in *Nyceryx ericea* (Pl. LIII. f. 44).

Another kind of asymmetry occurs in the legs and antennae. Here the difference is not observed in the appendages of the left and right side of the body, but in the right and left side of the appendages themselves. The antennae and legs are on the whole cylindrical, but in most instances the internal and external sides are more or less different. This is especially noticeable in pectinated antennae, and in the spines of the tibiae and tarsi.

Besides the differences in the genital armature and in the frenulum and retinaculum, the two sexes of the *Sphingidae* show very obvious distictions in other organs. These distinctions are the result either of the different development of one or the other organ in the two sexes, or of the appearance of special structures confined to the male. The sexual dimorphism is accordingly relative or absolute, the former being far more frequent among the *Sphingidae* than the latter as regards variety in the differences. One absolute sexual distinction occurs in all species of Hawk Moths. This is a scent-organ* situated at the base of the abdomen. It is found in all species. The orifice of the organ lies in the pleural membrane above the upper edge of the basal sternite (Pl. LXIII. f. 1. 2, *gl*). It is a cavity from which protrudes a bundle of long scale-hairs, which serve as distributors of the scent produced by the scent-cells. A groove or fold runs backwards from the orifice of the cavity over the pleura of the third segment, ending on the fourth. The tuft is sometimes retracted into the cavity, but frequently projects in the dry cabinet-specimens. Its colour is occasionally carmine or pink (*Temnora*). The organ is essentially the same as that found in some *Notodontidae*.

Another scent-organ is found on the hinder side of the anterior coxae.* It occurs in all groups of *Sphingidae*, but is very frequently absent or vestigial. The difference in the degree of development is often very pronounced in closely allied species. In *Coelonia fulvinotata* the organ is very strongly developed, while it is vestigial in *Coelonia solani*; and *Chromis erotus* and *heliodes* differ in a similar way. The organ is more often preserved and on the whole more prominent in the *Sphingidae semanophorae* than in the *Sphingidae asemanophorae* (*Acherontiinae* and *Ambulicinae*).

A third scent-organ is met with in one species only of *Philampelicae*—namely, in *Macroglossum godeffroyi*. In this insect the mid- and hindtibia are the bearers of the organ, which consists of a subbasal groove, situated on the outer side, and of a large tuft of hair-scales.

In the ♂ of *Sesia fadus* there is a black tuft of scales at the base and another near the apex of the foretibia, not met with in the other species of *Sesia*. We do not know the nature of these tufts.

In the genus *Epistor* we find a peculiar scent-organ on the forewing, reminding one very much of similar organs observed in *Lithosiinae*. The cell of the forewing of the males of *Epistor gorgon*, *E. taedium*, and *E. carifer* is

* Haase, *Iris* i. p. 159 ff. (1887).

distorted, being covered on the upperside by a fold projecting backwards from the subcostal vein and ending beyond the apex of the cell between R^1 and R^2. The width of the fold is different in the three species, being greatest in *Epistor gorgon*. Underneath the fold—*i.e.* covered by it—there is a mass of rather large, short, broad, non-dentate, creamy white scales and a bundle of woolly scale-hairs. The distortion of the cell and the neuration is best visible on the underside of the wing, where the cell bears short scaling, contrasting with the more woolly scaling on the rest of the wing. In the ♂ of *Epistor carifer* there is, besides, another structure on the forewing, consisting of an oblong and rather large cavity on the upperside in the cell near the base. The cavity bears erect scale-hairs ; the wing bulges out on the under surface, and is here covered with short and broad scales. All three species have a very woolly abdomen in the male sex, the hair-scales, which are long subdorsally, being directed obliquely dorsad (except on the first tergites) and massed together in flakes. The hindlegs, inclusive of the tarsi, are also very woolly in these males, appearing compressed and broadened. Such sexual distinction in the legs like this occurs also elsewhere, the forelegs of *Chromis erotus*, the hindlegs of *Pholus anchemolus*, and the hindtibia of *Himantoides undata*, for instance, being broadly scaled in the males and simple in the females.

The sexual differences in the antennae have been noted above. *Rhopalopsyche* is the only instance where the antennae are the same in the two sexes. The palpi are on the whole smaller in the female than in the male ; the most obvious differences occur in the *Ambulicinae*. The tongue is not rarely shorter in the female than in the male (*Protambulyx*, for instance). The abdominal end-tufts are also very often different in the sexes, the female possessing in such cases the more simplified tuft or no tuft at all (*Epistor ; Sphecodina ; Cypa ; Dilophonota ;* etc.). The abdominal side-tufts of *Oxyambulyx* are present only in the males. The spurs of the mid- and hindtibiae and the tibiae themselves are occasionally longer in the male than in the female (some *Polyptychus*), while the hindtarsus is longer in the ♀ than in the ♂ of *Pachylia ficus* and *Pholus anchemolus* ; and the armament of the tarsi is also not always the same in the sexes, the peculiar protarsal comb found in *Cocytius* being a male character (Pl. LXIV. f. 6). The sensory hairs at the end of the fifth protarsal segment (ventral side) are on the whole better developed in the female (Pl. LXIV. f. 13, *s*).

The wings, which are generally more elongate in the male, show very conspicuous dimorphism in some instances : *Polyptychus paupercula* and *contraria* ; the species of *Smerinthulus* and *Degmaptera ; Oryba achemenides ; Epistor*.

More frequent than conspicuous difference in shape is dichromatism. The sexual difference in pattern and colour is often so striking that the sexes have been mistaken for distinct species. Such obvious differences are observed in *Epistor*, *Himantoides*, *Oryba achemenides*, *Pseudosphinx*, *Isognathus*, *Erinnyis*, *Coelonia fulcinotata*, *Herse convolvuli* (not *cingulata*), *Metamimas australasiae*, and other species.

In the body of the Revision many details of the morphology of the *Sphingidae* will be mentioned which we have only touched upon in the foregoing summary. Though the Hawk Moths are a compact group, the diversity of development within the family is nevertheless so great that the subject is not in any way exhausted by our researches, to which time, material, and ability have set limits. Classification was the avowed object towards which the researches in the structure of the *Sphingidae* were undertaken. However, since classification as we conceive it gives expression to the blood-relationship of the forms classified, and since no sound verdict about the degree of relationship can be given without an inquiry into the phylogenetic development of the characters which distinguish each Hawk Moth, it is manifest that with the apparently narrow object of giving a classification of the *Sphingidae* issues are entered upon which bear upon the broad questions of development of the animated world, of which questions we have never lost sight in struggling through the embarrassing mass of detail presented by the 770 species of Hawk Moths. The value of detail for the solution of general questions has again and again been forced upon us during the preparation of this Revision.

At first sight it appears to be of little consequence whether 750 or 770 species of *Sphingidae* are known; whether *Aleuron iphis* is the same as *neglectum*, or distinct; whether *Odontosida* belongs to the *Philampelinae* or *Ambulicinae*. The distinguishing characters upon the discovery of which so much labour is expended in classificatory research may not seem to be worth the trouble, being apparently of interest only to the collector and specialist. Indeed, if systematic work did not go beyond distinguishing and naming the forms of animated nature and putting them into some kind of order, there would be justification for those who smile at the efforts of mere systematists. However, the discovery of distinguishing characters assumes at once an entirely different aspect, if the solution of the question "species or no species" is considered but a stepping-stone towards the higher aim of understanding the How? and Why? in Nature. That *Hyloicus perelegans* has a grey form so closely resembling *Hyloicus chersis* that it has hitherto always been mixed up with it, will not interest anybody except perhaps North American Lepidopterists. But if we add that this grey form has a reduced paronychium like *chersis*, while the paronychium is always distinctly lobed in the black-backed form, a difference often distinguishing genera or even subfamilies in Lepidoptera, the rigidity of what is elsewhere a specific or generic character breaks down at once, and it is further evident that, the agreement in the paronychium of the grey-backed *perelegans* with *chersis* being observable only under a high magnifying power, there are similarities which are decidedly not mimetic. Whether the right or left harpe of *Pachylia darceta* is the stronger developed, or whether both are the same, is as indifferent a question to the non-specialist as is the result of a cricket match to a Continental. However, if one knows that in the *Sesiinae* with asymmetrical development of the claspers the **left** side is the more reduced, and remembers the haste with which "laws" in development are often

formulated by biologists, the case of *Pachylia darceta* becomes of general importance, counselling caution, since *darceta* has the **right** harpe more reduced, and hence proves either that there is no inherited tendency in the *Sesiinae* to a left-sided reduction, or, if there is, that the opposite development has taken place in spite of that tendency. It may be a matter of little moment to an outsider that the only species in the second division of the *Sphingidae* which has in the pupa a projecting tongue-case, as it is found in many *Acherontiinae*, is *Rhyncholaba acteus*; but the matter becomes different if we explain that, firstly, the presence of a free tongue-case in *Rhyncholaba* and *Acherontiinae* is not a sign of relationship, as the organisation of the insects proves, and hence demonstrates the possibility of the appearance of a similar conspicuous character in very distantly related groups, and, secondly, that the similarity again cannot be mimetic, since the pupae are buried.

In chemistry and physics minute research discloses the secrets of Nature. In biological sciences minuteness of research is as much required as there, if we wish to understand the phenomena of life. Systematic work can do much towards that end; it is the only means of checking off, proving and disproving, generalisations. But to serve as a reliable censor of conclusions, the observations must be exact, and therefore minute, since exactness cannot be attained without minuteness of inquiry. A simplification of systematic research by narrowing it down, as advocated in certain quarters, to the solution of the questions "obvious difference or no obvious difference, hence species or no species, genus or no genus," takes the life out of it. But if these questions are made subordinate, and therefore systematic work subservient, to the higher issues of biology, the dry detail of distinguishing characters and the apparently futile labours of the describer of species and other classificatory units become all-important in the science of life, as supplying sound criteria, where otherwise a lively imagination might run wild and substitute plausible assumptions for facts. Looking from this point of view at the diagnoses of the genera and species of *Sphingidae* it will be found that they are a source for information of a general character.

If we compare the pedigrees (facing pp. 24, 499, etc.), with one another, and the characters there mentioned with the fuller descriptions given in the body of the Revision, the first thing which strikes one is the frequent repetition and reappearance of the same diagnostic character (for instance, the absence of a pulvillus, or the spinosity of the tibiae). Whether our classification is accepted as valid or not, the fact remains that there is very frequently a close agreement in one or more characters between species and genera of near or of distant relationship in the Hawk Moths, an agreement which renders the classification of the *Sphingidae* especially difficult. Since the agreement refers to many details of many organs, as well as to the colour and structure of the scaling and the shape of the body and wings—which give the insect its habitus—the *Sphingidae* furnish indeed an abundance of material for a Study of Similarity, towards which we offer a few remarks.

Although phylogenetically closely allied forms may differ from each other in one or more organs to a surprising extent, they are generally similar to one another, if not in aspect, at least in structure, and if not at one stage, at least at others of the metamorphosis of the individuals. The same kind of similarity or identity we meet again in species or genera which are not nearly related, but have preserved one or more characters of the common ancestor. It is evident that this kind of agreement stands in contraposition to similarities which are the outcome of evolution. The preservation of four wings in Lepidoptera, Orthoptera, Hemiptera, etc., and of six fully developed legs in most insects, the occurrence of ocelli in many Heterocera and other insects, of filiform or setiform antennae in most orders of Arthropoda, and the retention of a pad to the claw-segment of the tarsus in many Butterflies, Moths, and other insects, or of a frenulum in one Butterfly and the greater proportion of Moths, etc., etc., establish a similarity in respect to the said characters which is manifestly of quite a different kind from the similarity established by the acquisition of clubbed antennae or of a sucking-apparatus, or by the loss of the wings or the mouth-parts, or by the adaptation to bark in colour and pattern, or to leaves and sticks in shape.

Though the distinction between a resemblance preserved and a resemblance acquired is obvious, it is not so sharp as it appears to be at first sight, since the two kinds of similarity are connected to a certain extent by that acquired resemblance which is the direct outcome of inherited community of characters. We find, for instance, that the distribution of pale and dark colours on the legs of Arthropoda stands normally in close connection with the articulation, the segments being very generally pale-coloured at the joints. White-tipped tarsal segments, and tibiae with three pale rings are of common occurrence among insects, as are white-ringed antennae and white-ringed abdomina. Where there is a break in the surface of the skeleton of insects, there is normally also a break in the coloration. Thus we find a stripe along the eye and lines at the edges of the thoracical plates in members of nearly all orders of insects. The wing is perhaps the best example of a conspicuously coloured, regularly interrupted surface, where the connection between the pattern on the one hand and the outline and the division of the surface by the veins on the other is very obvious in a great many insects. The original pattern of the insect-wings (outstretched) is symmetrical to the body and symmetrical to the veins. On the triangular wings of Lepidoptera the modifying influence of the cross-veins and the oblique distal margin is especially conspicuous. The position of new markings is dependent on the position of the old ones, new lines appearing often along the old ones and rings around spots. The external lines of a vast number of Heterocera are distally concave between the veins according to the undulation of the distal margin of the wing, while the proximal lines are distally convex (respectively dentate) between the veins. The median space of the forewing extending from the costal to the inner margin and including the cross-veins seems to be greatly influenced in its pattern by these veins, a large number

of Lepidoptera exhibiting the same kind of median space, contrasting with the rest of the wing either by being different in colour or by the absence of lines transversely to the veins. The appearance of a "stigma" or a kidney-shaped mark on the wings of so many Lepidoptera is the direct consequence of the possession of cross-veins. Since the division of the wing-membrane is so similar in the various groups of Lepidoptera, it is only natural that there are many points of agreement in the pattern of species belonging to not nearly related groups. It is not the occurrence of this kind of similarity which is astonishing, but that it does not occur everywhere, and that—bearing in mind the remarkable phenomenon of "Mimicry"—Nature has abandoned in most cases similarity, though it offers such great protection to the species, as we must assume it to do, judging from the great number of cases of "protective" resemblance at which Nature has arrived in a roundabout way. However, notwithstanding the differences—in the first instance the outcome of segregation—outweighing the similarities, the agreement in some such detail as referred to above, which resemblance is the result of a general agreement in the structure of the insects, is the starting-point for a development towards more conspicuous similarities. The pale superciliary stripe, for instance, is continued in many *Sphingidae* over the pronotum and along the sides of the mesonotum; a mesial stripe begins between the two lateral ones on the occiput and runs over the thorax, ending on the abdomen. The lateral lines converging frontad, the three together are similar to an arrow. The same arrow-pattern is met with in other orders of insects—for instance, in Coleoptera (*Curculionidae*, *Cerambycidae*, etc.); and the agreement extends even further, the mesial vitta being either simple or divided into two lines, and these lines being either parallel or divergent behind, in the Hawk Moths as well as the Beetles. Moreover, the mesial vitta of the head and thorax becomes a sutural vitta on the elytra of Coleoptera, and similarly the hinder edge of the forewing of Lepidoptera, which corresponds to the sutural edge of the elytra, assumes often the pale colour of the thoracical mesial vitta in those Heterocera in which the wings have a roof-shaped position over the abdomen when the specimen is at rest. The conspicuous colouring (scaling, pubescence, or pigmentation) of the mesoscutellum found in many insects and the three rows of spots so frequently occurring on the abdominal sternites belong to the same kind of resemblance as the thoracical vittae, the respective markings being homologous in the various insects, evolution starting from similarity and resulting in higher resemblance. In structure the same phenomenon is no less frequently observed. Here we may conveniently distinguish between similarities arrived at by retrogressive and by progressive development.

Reduction of organs occurs very commonly among *Sphingidae*, and leads often to the loss of the organs. The disappearance of the horn of the larva in some *Philampelinae* and *Ambulicinae* and in *Lapara* (*Acherontiinae*); the reduction of the tongue-sheath of the pupa in *Ambulicinae* and several *Acherontiinae*; the absence of an externally visible sheath of the anterior femur of the chrysalis in

species of various subfamilies of *Sphingidae*; the loss of the tongue in some *Ambulicinae* and *Acherontiinae*, of the proximal pair of spurs, of the pulvillus and paronychium, of the frenulum and retinaculum; the reduction of the mid- and hind-tarsal comb and of the palpi; the reduction of the tarsal spines in number, of the tibiae and tarsi in length and of the head in size; the loss of the fasciculated ciliae in the male antenna of *Rhopalopysche*, of the abdominal spines in various *Ambulicinae*, of the patch of sensory hairs at the base of the palpi in the *Sphingidae asemanophorae*, and *Gurelca* and allies among the *Sphingidae semanophorae*, of the bristles on the pilifer, etc., establish between these *Sphingidae*, as well as between them and other Lepidoptera, a similarity in the points mentioned which is of importance for the proper comprehension of the origin of agreements in structure, since there is no doubt that, at least in most cases, these negative characters are independently acquired in the various groups of *Sphingidae* and other Lepidoptera. The loss of the wings in a number of Lepidoptera, and of the hindwings in Diptera and many Beetles, may be mentioned in this connection. The independent effacement of differences in consequence of loss occurs also in pattern. Uniformity in colour may be arrived at either by the exaggerated development of one colour leading to the suppression of a pattern, or by the markings disappearing on account of the non-development of the pigment (or of the particular structure in case of structural colours). The pattern is in most cases only partially effaced. The partial transparencies of the wings as found in *Cocytius* and some *Haemorrhagia* have no more to do with one another than have the entirely white anterior wings of some Beetles (elytra) and Butterflies. The loss of markings in *Mimas tiliae* is as independent from that of *Amorpha populi*, as is the disappearance of yellow abdominal side-patches in certain *Acherontiinae* and some *Macroglossum*. The pale colour frequently exhibited by a large percentage of specimens which are obtained by breeding in and in—for instance, in *Amorpha populi*—is due to the meagre production of dark pigments, and reminds one of the pallid cave-insects. The weakening effect of breeding in and in and the result of a life in dark caves are, therefore, similar in so far as both lead to the loss of pigment, producing clayish ochraceous forms. The causes are different; the result is similar. Indeed, if the numerous cases of the disappearance of distinctions in structure, colour, or pattern are inquired into, it will be found that the causes of the loss of distinctive positive characters and the reasons for their disappearance are as different as the starting-points of the retrogressive development which resulted in the effacement of the positive characters, replacing the picture which was variegated in pattern and structure by a clean surface.

The reduction of organs is often accompanied by the appearance of certain positive characters in *Sphingidae*. The small head is frequently crested; the small eyes become lashed, and the reduced tibiae often spinose. The abdomen, which has very weak spines at the edges of the segments, is often spinulose all over the tergites or assumes a woolly appearance. Weakened power of flight and broadened wings are frequently associated. The positive and negative characters

are not necessarily dependent on one another. Spinosity of the tibiae, for instance, occurs in very many insects without a reduction of the tibia having taken place, and eye-lashes are not always a sign of a reduced head. A conspicuous specialisation which is of common occurrence in insects is the prolongation of the foretibia into a pointed thorn. We find this thorn or claw among all subfamilies of *Sphingidae* except *Choerocampinae*. The prolonged outer spines of the first protarsal segment (generally three in number) found in many *Sphingidae* and other Heterocera are also a specialisation which does not necessarily indicate relationship, and so are the clubbed antennae of *Sphingidae*, Butterflies, *Aegeriidae*, some *Noctuidae* and *Geometridae*, *Agaristidae*, etc. The pectination of the antennae is of special interest. We find such antennae in several orders of insects. The remarkable point is that there are antennae which are similar **in aspect** to the pectinated ones, but are not pectinated. They are of two kinds. The one type is that commonly found in the males of *Sphingidae* where the seriated cilae look in a dorsal view like lateral expansions of the segments; and the other type, not met with among Hawk Moths, possesses a heavy subdorsal bristle on each side, which Entomologists have often enough confounded with a true process of the segment. Here we have an obvious resemblance not based on homology. Likewise, the pectination of the antennae of *Cressonia* and *Ceridia*, or of *Saturniidae* and *Eupterotidae*, though the antennae are similar to one another in aspect, are not homologous. Tibiae mottled with single dark scales have very often the appearance of being spinose. In the place of the before-mentioned foretibial claw there is in some other *Sphingidae* (for instance, some *Polytychus*) a heavy spine homologous to a hair, not to the claw. The horn-like projection of the palpus in the Acherontiine genera *Cocytius* (America) and *Coelonia* (Africa) is the third palpal segment, while the equally conspicuous projection found in the Sesiine genera *Aleuron* and *Enyo* (America) is a process of the second segment. The same segment has acquired a projection similar to the latter in the very distantly related African genus *Hypaedalia*. Similarities analogous to the above occur also in pattern. Lines, streaks, and spots on the wings, and spots and belts on the abdomen, superficially but strikingly alike in different insects, often prove on closer study not to be homologous, the belts being, for instance, basal to the segments in one insect and apical in another, and the wing-streaks standing here upon the veins and there between them. Such similarities, which mostly do not affect the general habitus of the insect, are nevertheless very instructive.

There is another kind of equally remarkable resemblance in some details met with among *Sphingidae* which appears at the end of more or less distantly related branches. It is *a priori* conceivable that a certain character of structure or pattern present in closely related forms is preserved when these forms develop divergently further and further. Now, just as this certain character may be lost in the one branch, or in some members of it, at one period, and in the other branch at the same or another time, so the character may at one time or the other develop progressively in either branch, and this progressive

development lead independently to an identical specialisation in the two divergent branches. The spination of the abdomen furnishes a noteworthy illustration. In the higher *Sesiinae* the spines become very strongly chitinised on the tergites and sternites, and those of the proximal row assume a short and broad form in *Sesia*, *Cephonodes*, and *Haemorrhagia*; the same form of spination is found again in the highest genera of the tribe *Nephelicae* of the subfamily *Philampelinae*—namely, in *Macroglossum*, *Rhopalopsyche*, and *Leucostrophus*—and only here. In the *Philampelinae* there appear here and there characters which are met with again among the *Sesiinae*—for instance, the very strongly clubbed antennae, the angulate mid- and hindcoxal merum, the close connection between abdomen and thorax, the fan-tail, etc.; while, on the other hand, *Philampelinae* have also arrived at similar specialisations as *Choerocampinae*—for instance, in the shape of the chrysalis, the sexual armature, the end-segment of the antennae, and the ocellated spots of the caterpillar. The American Choerocampine genus *Phanoxyla* is a derivation from *Xylophanes*, from which it has become different in acquiring an apical tuft to inner surface of the second palpal segment, a tuft which is present in many Old World *Choerocampinae*. The peculiar cavity at the end of the first segment of the palpus, on the outer side, occurring in all species of the Choerocampine genus *Theretra* and the derivations from this genus, is acquired also by a few species of the allied genus *Hippotion*, and it is highly surprising that the same peculiar specialisation, which does not seem to occur outside the *Sphingidae*, is as conspicuously developed in one solitary species of *Acherontiinae*, in *Megacorma obliqua*, the relationship of which with the *Choerocampinae* is very distant. This similarity reminds one of the projecting tongue-case of the pupa of the Choerocampine genus *Rhyncholaba* and many *Acherontiinae*, a Sphingid character confined to that one genus and the one subfamily. The pattern of the Hawk Moths offers also obvious illustrations of the kind of resemblance under discussion. The most striking is the similarity in the pattern of the abdomen of the lower *Acherontiinae* and the higher *Philampelinae*. Here we find those conspicuous yellow side-patches bordered by black which are restricted to these insects. The white abdominal belt of the American genus *Sesia* and the African Philampeline genus *Leucostrophus*, which belt Entomologists have erroneously considered to indicate a close relationship between the insects, may also be mentioned, as well as the black-bordered yellow hindwing occurring in many *Sphingidae* and other Moths, and the white fringe of the first abdominal tergite of the Oriental *Deilephila hypothous* and the American *Aleuron iphis* and allies. The antemedian and discal blackish brown bands on the forewing acquired here and there in *Sphingidae* are the result of the interspaces being filled in with blackish brown scaling. These examples of similarity are a kind of belated expression of relationship.

It will be observed that in a few of the instances mentioned the agreement in some character affects the aspect of the insects which have the character in common. There is a complete gradation from similarities in some small detail to similarities of the ensemble.

The cases of mutual agreement in aspect may be classified in two groups—similarity as the outcome of adaptation towards the same or similar extraneous objects, and similarity as the product of adaptation to each other.

The colour and pattern of the upperside of the body and forewing of *Sphingidae* are very generally imitative of the bark of trees, variegated with algae and lichens. The bark-pattern is common to a great many Moths, Beetles, Orthoptera, etc. The similarity is often enhanced by the appearance of projections—as, for instance, the thoracical tufts of *Erinnyis*, *Pseudosphinx*, *Hemeroplanes nomius*, *Epistor*, and *Notodontidae*. The silvery marks of the forewing of *Nephele*, *Hemeroplanes*, *Madoryx*, etc., and, among *Noctuidae*, of *Plusia*, break the uniformity of the wing, as do white lichens that of the bark. The subapical buffish patch of *Eurypteryx molucca* and some Notodonts has the same effect. The shape of the distal margin conforms very often to the irregularity of the bark. A dentate, scalloped, or lobate distal margin may be acquired almost everywhere. In *Sphingidae* a very irregular distal margin occurs, commonly among *Ambulicinae*, *Sesiinae*, and *Philampelinae*. In *Acherontiinae* the margin is at the highest undulate, while there is one (American) species of *Choerocampinae* which has an irregularly lobed forewing looking like a piece of wood (*Phanoxyla*). A resemblance to leaves is also frequently met with, especially among *Ambulicinae*. The leaf-like forewing may either be entire and have a dark apical line indicating the midrib (*Clanis*, some *Polyptychus*), or it may be irregularly lobed. *Phylloxiphia* (Pl. I. f. 4) has perhaps the most leaf-like entire forewing among *Sphingidae*, the midrib being here represented by a line running from the apex to near the base. The clayish colour of this insect, agreeing with the colour of dry leaves, occurs abundantly in Hawk Moths. A leaf-imitation after the well-known pattern of *Gastropacha quercifolia*, in which the widened hindwing projects beyond the costal margin of the forewing, is found in some *Ambulicinae*, *Sesiinae*, and *Philampelinae*—namely, in *Amorpha*, *Calasymbolus*, *Phyllosphingia*, *Stolidoptera*, and *Hypaedalia*, perhaps also in *Degmaptera*.

Besides the imitations of leaves, bark, and other non-animal subjects, there are striking cases of resemblance to other insects among the *Sphingidae*. The imitation of humble-bees and humming-birds by some *Sesiinae* is well known. And here again similarity between the mimetic *Euproserpinus flavofasciata* and the mimetic *Haemorrhagia diffinis* is purely adventitious, both imitating the same or similar models, and therefore resembling also each other.

The resemblance of two species to each other acquired indirectly in the way indicated is of frequent occurrence. And it is easy to perceive that, since the similarity has independently arisen, insects similar to each other in this way may occur in widely separated countries.

Though very many *Sphingidae* are similar to one another, there does not seem to be a species which mimics another Sphingid—*i.e.* of which the pattern or shape has been developed directly in relation to the other.

The various kinds of similarities shortly referred to are met with again in other groups of insects. They demonstrate, we think, not only that there are various ways to arrive at and different causes for resemblance, but also that there is abundant material of similarity in details upon which selection may seize, and modify and augment the incipient resemblance, and produce those wonderful likenesses which illustrate that fascinating phenomenon called Mimicry.

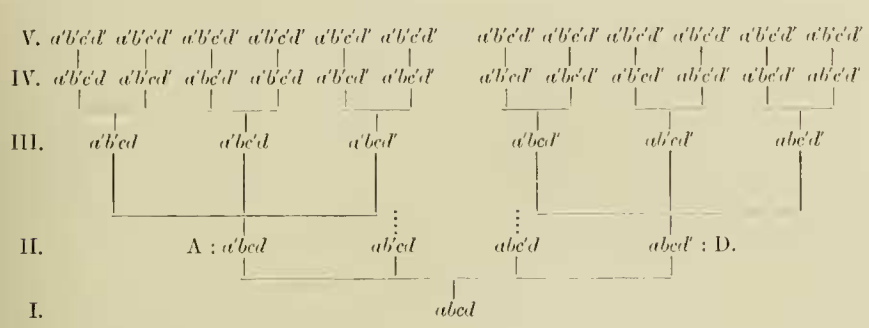
A study of resemblance from this point of view is incidentally also a study of relationship, and therefore an essential part of classification. It is well known that the older students of Entomology were frequently taken in by similarities which do not indicate relationship, associating often widely different species on account of superficial resemblance. The older systematic works, and old collections which have not been disturbed, testify to this abundantly. But even modern work, or rather work of recent date, is not free from striking blunders of this kind, although the flourishing study of Mimicry has, or should have, made everybody suspicious of mere resemblances in aspect. We well remember trying in vain to convince a famous Lepidopterist, now dead, that the streaked Indian *Papilio macareus*, *xenocles*, etc., are not nearly related to the streaked form of *Papilio clytia*; and we notice in a recent number of *Lepidoptera Indica* that the mimetic *Papilio rhetenor* and its models are housed in the same Moorean genus. The association of the *Sphingidae* with the *Aegeriidae* and *Zygaenidae* from Linné down to recent times was due to a certain similarity in the shape of the antennae being erroneously interpreted as meaning relationship. The older writers were the more convinced of the correctness of the association of the *Aegeriidae* with the Hawk Moths, since the clear-winged Aegeriids appeared to them to be connected with the ordinary *Sphingidae* by the equally clear-winged species of the Sphingid genera *Cephonodes* and *Haemorrhagia*. The fallacy of the conclusion has now become evident to every student of Lepidoptera, though perhaps not to every collector of "flies." The similarity of *Pseudosphinx tetrio* to species of *Protoparce*, the "Bombycine" appearance of *Arctonotus lucidus* and *Lapara*, the resemblance of *Deïdamia inscriptum* and other *Philampelinae* to certain *Ambulicinae* (= *Smerinthinae* auct.), the agreement in appearance between *Proserpinus flavofasciata* and *Haemorrhagia*, of *Nyceryx hyposticta* and *Amplypterus*, of *Akbesia davidi* and *Proserpinus*, of *Sesia* and *Leucostrophus*, etc., etc., have frequently misled even modern classifiers of *Sphingidae*.

The student who tries to build up a classification based on relationship has to beware especially of two kinds of similarities referred to above: (1) similarity as the outcome of reduction, and (2) similarity as the result of adaptation to similar extraneous objects or to each other.

The first point is the more frequently overlooked in classification, and requires some further explanation.

If *a*, *b*, *c*, *d* are four organs of a species or a genus, and *a'*, *b'*, *c'*, *d'* the same in their most reduced state; if, further, the species or genus develops

into four others by one of the organs becoming reduced in each, and these four again into more in the same way, we have the following diagram (for the sake of convenience in printing the middle part of the diagram has not been completed):—



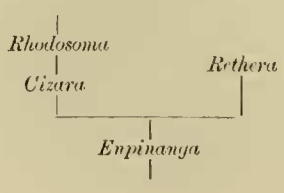
The development, starting from I., results first in a series of four derivations (II.) differing from one another in two organs. The second series of derivations (III.) contains forms deviating from each other in two, three, or four organs. In the third series (IV.) the forms differ only in two organs, or are identical. And we arrive finally (V.) at a series of identical forms. There is divergency from I. to III., and convergency from III. to V. Considering now the phylogenetic relation and the similarity of the various modifications, it will be found that the derivations of A in series IV. are more similar to the derivations of D in the same series than to A in series II., and that the derivations of A in series V. are indistinguishable (in organs *abcd*) from the respective derivations of D in the same series, while they are different from the forms in series IV. from which they are derived. It is therefore evident that the classifier who judges from these organs *abcd* alone cannot possibly find out the true phylogenetic connection between the various forms. He will easily mistake the forms which are equally reduced for forms which are closely allied. To him the members of series V. will appear to be very near relations, while they are in fact the end-products of different phylogenetic branches.

Let us take as illustration the retrogressive development so often observed in *Sphingidae* of the tongue, the midtarsal comb, and the claw-segment. If we start from a form with long tongue, with midtarsal comb, and with fully developed pulvillus and paronychium, and assume as before that one of these organs becomes reduced in each derivation from that ancestral type, we arrive finally at forms which agree with one another in having all the four organs reduced. Therefore the reduction of the tongue and the absence of the midtarsal comb, of the pulvillus, and of the paronychium in those species or genera are not an expression of close relationship. Looking at the pedigree of the genera of *Sphingicae* (facing p. 30), it will be noticed that a reduction and loss

of organs like those occur indeed in many genera which stand far apart. Loss, reduction, and fusion may occur independently everywhere. An instructive illustration of erroneous classification of this kind outside the *Sphingidae* are the *Ithomiinae* (= *Neotropinae*), which are divided by Salvin and Godman and later on by Schatz into two groups, the one containing the forms with strongly reduced forelegs, the other those with less reduced forelegs. The groups as they thus stand comprise quite heterogeneous material; they are not a division based on relationship, but on similarity in that one organ, each group containing genera which have their nearest relatives in the other, the species or genera with reduced forelegs being derivations from such with more fully developed forelegs. The striking resemblance in pattern between certain members of the two groups is explained, at least in some cases, by the similar species being nearly related, and not by having developed convergently.

A form which has lost an organ becomes not only similar in this respect to another which has equally lost it, but also to those which never did possess the structure. The abdominal spination, which is apparently confined to the *Sphingidae*, is lost in several genera, which therefore agree in the non-spinose abdomen with the *Notodontidae*, for instance. The loss in many *Sphingidae* of the midtarsal comb, of the forecoxal scent-organ, and of the friction-organ of the clasper constitutes again similarity with *Notodontidae*, *Saturniidae*, and other Moths, and not relationship.

There is another point illustrated by the pedigrees of *Sphingidae* which is of equal classificatory importance. A genus and a species are a composition of many organs; and since each organ becomes in most cases modified independently from the other, it is evident that a species or genus may be specialised in some and generalised in other organs. It is indeed a rule holding good in nearly all *Sphingidae*—we say "nearly" in order to be on the safe side—that a species or genus is further advanced than its nearest allies in some respects and at the same time left behind in other details. This being so, it is clear that a genus or species is not (or rarely) a direct derivation from another. Though we have directly connected the genera with one another in the pedigrees, we do not mean to say that, for instance, *Proserpinus* is a derivation from *Rhodosoma* as this is now, but wish to indicate only that *Rhodosoma* is of all recent genera the one which comes nearest in the characters mentioned in the pedigree to the ancestral genus of which *Proserpinus*, *Amphion*, and *Sphecodina* are developments. Each genus is, so to speak, the end-development of its own branch. In the pedigree facing p. 499 the genera *Enpinanga*, *Rethera*, *Cizara*, and *Rhodosoma* are thus connected:—



We have adopted this kind of connection for the sake of simplicity of printing. The pedigree should read as follows :—



If connected like this, each genus may have acquired its own specialisations after the point of separation, and each may also have preserved generalisations lost by the nearest allies after separation.

GEOGRAPHICAL DISTRIBUTION.

The Hawk Moths are an essentially tropical family, the number of species existing in the temperate regions being comparatively small. Very few *Sphingidae* extend into the Arctic Regions, and then only as occasional visitors, no species being known to breed beyond the Arctic Circle, though some (*Amorpha populi* and *amurensis*, *Sphinx ocellata*, *Celerio gallii*, *Hyloicus pinastri*) may be expected to occur as far north as their food-plants go. As the greater number of species have a powerful flight, and are, moreover, often wanderers, covering wide distances, the area inhabited by some of the species is very extensive.

The proportion of geographically uniform species of *Sphingidae* is large as compared with other families of Lepidoptera. Methodical research has proved to the systematist that countries like West and East Africa, India and the Malayan Islands, Central and South America and the Antilles, the Andes and Eastern Brazil, etc., etc., are inhabited by special races of nearly every species of Butterfly there occurring. The student is, *a priori*, certain in most cases that a species of Butterfly not yet discovered in some such district will, if occurring, exhibit some kind of distinction. In *Sphingidae a priori* conclusions like this would mostly be wrong. Since geographical variation depends on geographical isolation, it is evident that those Lepidoptera which are stationary are far more variable geographically than those which are not prevented by geographical barriers from constantly crossing over to other districts. The power of flight, however, is as such no factor effacing the geographical barriers. The swift-flying *Charaxes* and *Papilio* vary geographically as much as do slow-flying Butterflies; and in birds—which may be called stationary from the point of view of a student of geographical distribution in so far as they breed in their native country—geographical variation is also the rule and not the exception. On the contrary, the more powerful the flight, the more is an animal enabled to flee from or resist the factors of passive distribution (water and wind), to counteract their influence. But if powerful flight and the habit of wandering during the period of propagation coincide in a species, the

geographical barriers become ineffective, and the influence of isolation (segregation) is annulled. The wandering Hawk Moths, like *Acherontia atropos*, *Herse convolvuli* and *cingulata*, *Hippotion celerio* and *osiris*, *Deilephila nerii*, *Theretra nessus*, etc., do not vary geographically, or only in a slight degree. However, considering what we have said about the power of flight and isolation, it cannot be wondered at that a good many species of swift-flying genera have developed into geographical varieties (= subspecies) in spite of their power of flight. Notwithstanding this fact, in the *Sphingidae* the rule holds good that, *on the whole*, the sluggish species are more often and more distinctly variable geographically than the swift-fliers, and that, further, the areas of the geographical races of slow-flyers are mostly smaller than those of the subspecies of less sluggish Hawk Moths, as exemplified by *Ambulicinae* and *Choerocampinae*.

There is only one cosmopolitan Sphingid, *Celerio lineata*; it consists of three subspecies, one inhabiting the Western Hemisphere and two the Eastern. *Herse convolvuli* and *Hippotion celerio* occupy practically the whole Old World, while *Herse cingulata* and *Protoparce sexta* occur from Canada to Patagonia. One species (*Celerio gallii*) is common to the Nearctic and Palaearctic Regions. *Cephonodes hylas* is found, in three subspecies, from Sierra Leone to Madagascar and eastwards to Australia, with a wide gap in the Malay Archipelago. *Deilephila nerii* inhabits the whole Aethiopian Region, and extends far into Europe and south-eastwards into Western India and Ceylon. A number of species occur all over the Aethiopian Region without being split up into subspecies (*Hippotion eson*; *Basiothia medea*; *Coelonia fulvinotata*; etc.); others are of wide distribution in the Palaearctic or Oriental Regions (*Macroglossum stellatarum*; *Hippotion boerhaviae*, *velox*; *Theretra nessus*; *Cephonodes picus*; etc.); and others again occur all over the Neotropical Region or go even far into the northern half of the New World (*Xylophanes tersa*, *pluto*; *Pseudosphinx tetrio*; *Erinnyis alope*; *Epistor lugubris*; etc.). The distribution of such common species is very instructive in one respect. Although their range is wide, it is nevertheless restricted, and we ask ourselves, What antagonistic factors are there preventing these *Sphingidae* from occupying the whole globe?

A country must be accessible to a species. If there is a practically unsurmountable physiographical barrier, the species have little chance of passing over it. The swift-flying *Sphingidae* are not able to cross the Atlantic and Pacific Oceans, none of the New and Old World species being identical, not even *Celerio lineata* and *gallii* being the same in the Western and Eastern Hemispheres; and the Indian Ocean is an equally effective barrier. But there is no such barrier to prevent *Macroglossum stellatarum*, which ranges from Morocco and Ireland to Japan and North West India, from going farther south and east in India; no physiographical chasm faces in Spain the Aethiopian *Hippotion osiris*, which extends from Madagascar to the Pyrenean Peninsula; no geographical barrier keeps the African *Deilephila nerii* back from settling

farther east than South India and Ceylon, and prevents *Protoparce ochus*, so common in Mexico, from extending southward beyond Venezuela; no ocean, no high mountain-range, and no wide desert restrict *Oreeta* to Southern Brazil and Argentina, *Theretra capensis* to South Africa, *Hyloicus lugens* and allies to Central America, *Hyloicus chersis* and allies to North America (and Mexico), and *Celerio vespertilio* to Central and South East Europe. The range of these *Sphingidae* is restricted because the conditions of life (temperature, food, composition of fauna, etc.) are not suitable outside their present range. It is therefore evident that the limits of the range of a species are determined by two kinds of factors: physiographical barriers, beyond which the species is physically prevented from going; and biological barriers, beyond which the species is not able to exist. This being so, it follows that it is erroneous to conclude that the limits of the range of species indicate always that a physiographical barrier has formerly existed, that there was in the Continent or the chain of Islands a discontinuity barring the way. One has to carefully discriminate between those facts of geographical distribution which allow of conclusions being drawn as to the former configuration of the earth's surface, and those facts which are the result of the action of biological causes.*

Since anything strange attracts more attention than the normal, it is not rarely the unexpected upon which the student of geographical distribution lays most stress, often exaggerating the significance of single cases and drawing conclusions from them which are contradicted by the other, normal and hence neglected, cases. Some small percentage of an Indian element in the fauna of Madagascar misleads many a student to treat Madagascar as standing faunistically closer to India than to Africa, and some small but conspicuous difference in the fauna of Bali and Lombock, which difference is in insects not larger than that between most other adjacent Malayan islands, gave rise to the famous but (in Lepidoptera) arbitrary Wallacean line separating the Malay Archipelago into a western and an eastern district. Among the *Sphingidae* we find a number of species and genera with a peculiarly striking distribution which might easily give occasion to similarly fallacious and misleading conclusions. *Cephonodes hylas* consists of three subspecies, which occur one in Africa and Madagascar, another in India, China, and Japan, and the third in tropical Australia, no representative being found in the Malay Archipelago. *Celerio lineata* has two subspecies in the Old World: one inhabiting continental Asia, Africa, and Europe; and the second tropical Australia. The genus *Nephele*, so common in the Aethiopian Region, has but one species each in India and the large Sunda Islands and Australia. All these insects are so common that it is not likely that they have been missed by the collectors in the Malay Archipelago. Further, the genus *Cephonodes* has four species in the Malagassic Subregion, six in the Papuan Subregion, and not more than two anywhere in India and the Malay Archipelago. Looking at such cases, the Antarctic Continent most conveniently comes on the scene as a *deus ex machina* to explain the peculiarity in the distribution,

* See also *Nov. Zool.* iii. p. 505 (1896).

while the true cause of the absence or scarcity of those insects in the Malay Archipelago is probably of quite a different kind, as we shall see later on. The North American *Sphecodina abbotti* is confined to the Atlantic side of the Continent; the only other species of the genus (the only near ally, in fact, of *abbotti*) is restricted to the Pacific side of Asia (Amurland, China). The Indian genera *Apocalypsis* and *Pseudodolbina* stand quite isolated in the Old World, their nearest (and very close ally) being the Neotropical *Euryglottis*. The South African genus *Rhodafra* comes nearest to the Palaearctic *Pergesa*. If we compare such cases with the distribution of *Celerio*, of which one species is cosmopolitan, one Holarctic, several Palaearctic, and one each Malagassic, Argentinian, Chilian, and Cuban, while two are confined to the Sandwich Islands, it becomes obvious that the interrupted range of genera or allied genera is the result of the extinction of the insects (or allied species) in the now non-inhabited intermediate districts rather than the result of great geographical changes. We have to do here with the remnants of once more uniformly distributed groups, remnants existing where by chance the conditions were favourable for their preservation. However, it is not our intention to speculate on the apparently abnormal distribution of single species and genera, fascinating as it is, but to lay before the reader a short summary of the actual state of the distribution of the *Sphingidae*, from which he will better understand the composition of the Sphingid fauna of the various areas than from a speculative elucidation of single cases. Accepting the Wallacean division of the globe into five Regions, we have a distribution of the 770 species of Hawk Moths, as illustrated in the table on the opposite page.

There are only 2 species common to the Western and Eastern Hemispheres, each represented in America by 1, and in the Old World one by 2 and the other by 1 subspecies. Of the remaining 768 species, as yet known, 293 are peculiar to the New World, including the Sandwich Islands (3 species), and 475 to the Eastern Hemisphere. Since the Papuan Subregion and Africa harbour without doubt a great many undiscovered species, proportionally more than South and Central America, we can estimate the proportion of the species inhabiting the New and Old Worlds as being 1 : 2, or presumably 320-odd to 650-odd. The superiority of the East over the West of the globe in the number of species of Hawk Moths is quite intelligible, since tropical America is far smaller than the tropics of the Eastern Hemisphere, does not offer so much variety in the conditions of life, and is not so broken physiographically. A heteromorphic country has a heteromorphic fauna.

The paucity of the *Sphingidae* in the temperate Regions is very apparent in the table. North America, Europe, North and Central Asia, and Palaearctic Japan, where few new species will be discovered, if any, possess only 100-odd species peculiar to them, as compared with 620-odd peculiar to the only partially explored tropical and subtropical countries. New discoveries will alter the proportion so much to the disadvantage of the northern temperate Regions that the proportion will ultimately be about 1 : 9, according to our calculations.

DISTRIBUTION OF SPECIES.*

SUBFAMILY.	Neotropical Region.	Nearctic Region.	Palaearctic Region.	Oriental Region.	Aethiopian Region.	Cosmopolitan.	Western Hemisphere.	Eastern Hemisphere.
Acherontiinae : 136 .	54	28	11	19	18	—	84	52
		2	2					
			1					
			1					
Ambulicinae : 150 .	17	6	14	50	54	—	25	125
		2	7					
Sesiinae : 121 . .	81	5	9	13	3	—	95	26
		9			1			
Philampelinae : 219 .	17	13	6	103	71	—	33	186
		3	5					
			1					
Choerocampinae : 144 .	53		8	43	27	1	56	86
	3	1	6				2	
			1					
			1					
Total : 770 . .	217	54	48	226	172	1	293	475
	19	1	20	1			2	
			3					
			2					

* The numbers at the rectangular brackets └——┘ connecting the Palaearctic and Aethiopian Regions are the number of species common to these two Regions. The numbers at the non-rectangular brackets connecting the same Regions are the numbers of species common to the Palaearctic, Oriental, and Aethiopian Regions.

The differences in the number of species between the three tropical Regions are not considerable, the Neotropical Region possessing altogether 236, the Aethiopian 179 (many new ones will be discovered), and the Oriental 250. The Palaearctic and Nearctic Regions have each 75 species.

The differences in the distribution of the species of the five subfamilies into which the *Sphingidae* fall in our classification are remarkable. The *Acherontiinae* and *Sesiinae* are for the greater part American, while the *Ambulicinae*, *Philampelinae*, and *Choerocampinae* have more representatives in the Old than in the New World. The difference is especially large in the case of the *Sesiinae* on the one hand, and *Ambulicinae* and *Philampelinae* on the other. The proportion between western and eastern species of *Acherontiinae* (84 : 52) is almost exactly reversed in the *Choerocampinae* (56 : 86). The *Ambulicinae* are most numerous in Africa, nearly half of the *Philampelinae* are Oriental, and about one-third of them Aethiopian, while the Neotropical Region has scarcely one-twelfth of the total. North America has no single species of *Choerocampinae* of its own, but Central and South America possess more species than any other single Region. The number of species of *Acherontiinae* is much larger in the Neotropical Region than anywhere else.

However, the numbers of species which inhabit a country in themselves cannot be trusted when forming an opinion on the diversity of its fauna. Comparing, for instance, the number of *Choerocampinae* peculiar to the Neotropical Region with the number of purely Palaearctic species (48), it would appear from these figures alone that the Palaearctic Sphingid fauna was not more diversely developed than the *Choerocampinae* of South and Central America ; whereas, in fact, these Neotropical Sphingids belong to only three allied genera, *i.e.* are very homogeneous, and the Palaearctic species to more than twenty genera of five subfamilies. The diversity in the development of a family is better illustrated by the genera of the country, since a genus is a category higher than species, representing as it were the generalised state of development of which the various congeneric species are modifications. Each Region has one or more genera containing a large number of species, while the nearest allied genera comprise as a rule few or single species. *Protoparce*, *Erinnyis*, and *Xylophanes* are large Neotropical genera ; *Hyloicus* has numerous species in North America, *Celerio* in the western half of the Palaearctic Region, *Macroglossum* and *Theretra* in the Oriental Region, and *Polyptychus* in Africa. Such genera and the commonly occurring species give a country its special feature from the point of view of a collector, while the number of genera and their diversity are the more important feature for the classifier and for the student of the origin of the fauna, relying as they both do principally upon the affinities presented by the genera.

We have grouped the 770 species of *Sphingidae* in 167 genera, of which the table here following gives the numerical distribution. Since genera are groups of species, and hence generally of wider distribution than single species, the number of genera common to adjacent Regions is proportionally very much larger than the number of species common to them.

DISTRIBUTION OF GENERA.

SUBFAMILY.	Neotropical Region.	Nearctic Region.	Palaearctic Region.	Oriental Region.	Aethiopian Region.	Cosmopolitan.	Western Hemisphere.	Eastern Hemisphere.
Acherontiinae : 44 .	6 — 7 (2); 6 — 11 (1); 2 — 11 (1)				11	1	15 : 27 (1)	
Ambulicinae : 44 .	4 — 3 (1); 3 — 10 (1); 3 — 12 (1)					—	8 : 35 (1)	
Sesiinae : 24 . .	14 (7)				1 (1)	—	21 : 2 (1)	
Philampelinae : 41 .	1 — 6 (1); 6 — 2 (2); 2 — 12 (3); 12 — 10 (1); 2 — 10 (3)					—	8 : 31 (2)	
Choerocampinae : 14 .	1 (1)			2 — 2 (2); 2 — 5 (1); 2 — 5 (1)		1	2 : 11 (1)	
Total : 167 . .	26 — 16 (12); 16 — 7 (3); 7 — 36 (13); 36 — 38 (6); 26 — 7 (1); 7 — 38 (1); 26 — 38 (1); 16 — 36 (6)					2	54 : 106 (7)	

The New World has 54 genera which do not occur outside it; 106 are peculiar to the Eastern Hemisphere; while 7 are common to both. The proportion between genera and species is, therefore, nearly the same in either hemisphere. Taking into account the origin of the genera as shown in the following pages, and leaving aside the truly cosmopolitan *Celerio*, there are 53 genera of American extraction, against 113 of Old World origin.

Some significant discordance will be found in the numerical distribution of the genera and species when comparing the two tables (pp. cv. and cvii.). The Western Hemisphere has one and a half times as many species of *Acherontiinae* as the Old World, but they are more uniform, belonging only to 16 genera; whereas the species of the Eastern Hemisphere are grouped in 27 genera, representing many more steps in the development of the *Acherontiinae* than do the Transatlantic forms. On the other hand, the 26 Old World species of *Sesiinae* belong only to 3 genera, while America possesses 22. In *Choerocampinae* America, with its 3 genera, of which 1 is cosmopolitan (*Celerio*), stands far behind the Old World, which has 12, though the proportion of the species is 53 : 85.

The difference in the proportion of the species and genera is instructive in another respect. Looking at the table of genera, it will be manifest that the student of geographical distribution who bases his conclusions on the *Sesiinae* alone would have only one centre of development, which has given off a few branches to other countries; there would be no question of "Regions." If he took the *Choerocampinae* as the basis of his zoogeographical division of the earth, Aethiopia and Indo-Australia might become Regions and the rest of the globe appendages of them. If he based his exposition on the *Philampelinae*, Africa, Indo-Australia, and North America would rank as Regions, and South America, Europe, and temperate Asia appear to be zoogeographical appendages of them. While in the case of the *Acherontiinae* there would be four Regions. It is evident from this that the division of the globe into zoogeographical Regions is different according to which group of animals is taken as the sole basis of the division, or, in other words, that the division which is correct in one group of animals does not necessarily apply to every other group. That the Neotropical, Aethiopian, and Oriental Regions are nevertheless natural zoogeographical districts in all larger groups of land and freshwater animals is not to be wondered at, since these Regions comprise each the subtropical and tropical parts of a continent and its satellites of islands. America north of Mexico and Europe and temperate Asia are by no means so well characterised as, and co-ordinate to, the other three Regions.

In the above tables of distribution we have included the Papuan *Sphingidae* in the Oriental fauna. Australia, New Guinea, the islands farther east, and those westward to the Moluccas have 26 genera of Hawk Moths, of which 6 have not been found elsewhere. The Palaearctic Region has 7 peculiar genera out of 30. These figures alone would show, therefore, that the Papuan countries were as much entitled to the rank of a Region as the northern temperate Old World zone; or, on the other hand, since the proportion of genera peculiar to

each is so very small, that neither the Papuan nor the Palaearctic countries can be considered to be a Region in the distribution of the *Sphingidæ*. But if we sink them both to the rank of a Subregion of the Oriental Region, with which the Palaearctic countries have 18 genera and Papuasia 19 in common, the most characteristic feature of the temperate Old World would be swallowed up; the Oriental Region would receive foreign elements, and hence the relation of the faunae of the Old and New Worlds be very much obscured. The Palaearctic countries being particularly important as a connecting-link between the Old and New Worlds, having many affinities with North America, as we shall see further on, we give them the rank of a Region, in spite of the close relationship with the Oriental fauna. Here again we see that the purely numerical consideration of a fauna does not give its true position in respect to geographical distribution.

In order to understand the composition of the fauna of a district, the geographical origin of the various members has to be inquired into. A point essential towards this object is manifestly the knowledge of the relationship of the various species. And as the grouping together of species into genera is meant to be a grouping of species of the same origin, it is further evident that the correct composition of the genera and their correct position in the classification are necessary premisses for sound zoogeographical research. Exponents of zoogeography who rely on catalognes—in which the distribution is far more erratic than in Nature—having themselves not enough knowledge of the animals to detect mistakes, cannot go beyond the numerical stage in the treatment of the distribution, and, if they do, will as often be wrong as right in their conclusions, constantly finding in the faunae discrepancies and similarities which are nothing but the result of an insufficient study of the animals in question. If we took, for instance, the classification of the *Sphingidae* in Kirby's *Catalogue*, Butler's *Revision*, Druce's *Heterocera of Central America* (in *Biol. Centr. Amer.*), and Hampson's *Moths of India* as the basis for the exposition of the geographical distribution of these insects, we should find a far greater similarity between the Neotropical Region and the tropics of the Old World than there really exists, numerous genera being said to occur in both the Eastern and Western Hemispheres, while closer inspection proves these genera to be quite "unnatural" (heterogeneous), and the various heterogeneous components to belong to different genera peculiar either to the New or to the Old World, *Protoparce*, "*Diludia*," "*Triptogon*," "*Ambulyx*," *Pseudosphinx*, *Darapsa*, *Perysea*, *Macroglossum*, "*Aellopus*," "*Choerocampa*," *Theretra*, etc., etc., being names employed erroneously for mixtures of Old and New World *Sphingidae*.

Proceeding to examine more closely the composition of the Sphingid fauna of the various Regions, we take them in the order as they come in the tables of distribution on pp. cv. and cvii. The **Neotropical Region** is inhabited by 39 genera, containing 237 species. Two of the genera (*Celerio* and *Herse*) and one species (*Celerio lineata*) are cosmopolitan. The remaining 37 genera may be classed in two groups: 22 which are confined to the Neotropical Region, and 14 which occur also outside it. We will examine the latter first. They are: *Protoparce*,

Hyloicus, *Chlaenogramma*; *Protambulyx*; *Pseudosphinx*, *Erinnyis*, *Grammodia*, *Pachylia*, *Epistor*, *Cautethia*, *Perigonia*, *Sesia*; *Pholus*; *Xylophanes*. In addition we must mention *Sphinx*, *Pachysphinx*, and *Arctonotus*, which extend from North America into Mexico, and are not truly Neotropical. *Hyloicus* has many species outside the Neotropical Region; but the section of the genus which is Neotropical does not occur northward of the Southern United States. *Chlaenogramma* consists of two species, one inhabiting the Atlantic Subregion of North America, the other Argentina.* *Protoparce* has two truly Nearctic species (*quinquemaculatus* and *sexta*), besides a great number of Neotropical ones; the same applies to *Pholus*. The remaining 10 genera are Neotropical, extending in one or a few species into the Southern States of the Nearctic Region, or going farther north without having developed Nearctic species. Among the 22 genera confined to the Neotropics there is only one (*Monarda*) which is not of Neotropical origin, belonging to the branch of the *Ambulicinae* to which *Cressonia*, *Sphinx*, *Amorpha*, etc., belong, and of which the Oriental *Callambulyx* is the most primitive genus. All the other 21 genera are truly Neotropical. Hence it is clear that the only foreign element in the Neotropical Region is *Monarda*, and this is known only from Mexico. None of the other Regions have such an almost exclusively autochthonous Sphingid fauna. The Neotropical genera of *Acherontiinae* are all developments from the same stem, of which *Cocytius*, *Amphimoea*, and *Protoparce* are the most generalised divisions, coming near the Old World genera *Xanthopan* and *Meganoton*, which are, however, still lower in organisation than *Cocytius*. None of the New World *Acherontiinae* have preserved the organ of friction of the claspers and eighth abdominal tergite, which a number of the Old World genera have retained.

The 4 Ambulicine genera of the Neotropical extraction are *Protambulyx*, *Amplypterus*, *Orecta*, and *Trogolegnum*. The last two are clearly modifications of *Amplypterus*, and this and *Protambulyx* are near allies of the Oriental *Compsogene*, which is the most primitive of all recent *Ambulicinae*. It is worthy of note that both derivative genera occur in the border districts of the Neotropical Region, *Orecta* in the South and *Trogolegnum* in the North.

The *Sesiinae* are a special feature of the Neotropical fauna, the very few genera (3) occurring outside it being derivations from the Neotropical stock.

The *Philampelinae* are very poorly represented; the two genera occurring are confined to the New World, and closely allied to one another, *Tinostoma* being found on the Sandwich Islands only, while *Pholus* is widely distributed over America and contains many species. The *Choerocampinae* are rather uniform in development, there being only three genera, of which one is cosmopolitan. The other two are truly Neotropical, *Xylophanes* with fifty species and *Phanoxyla* with one, the species of *Xylophanes* which are found in the Nearctic Region being Neotropical ones extending northward. *Phanoxyla* is a specialisation of *Xylophanes*, and this is a derivation from the cosmopolitan genus *Celerio* —*i.e.* from an ancestral genus of which *Celerio* is the nearest recent representative.

* The locality Costa Rica is doubtful.

As a matter of course the Neotropical *Sphingidae* are not uniformly distributed within the Region, though the greater proportion is found nearly throughout the tropical part of South and Central America. The commonest species of which large numbers of individuals seem to occur everywhere are: *Herse cingulata*, *Cocytius duponchel*, *Protoparce sexta* and *rustica*, *Protambulyx strigilis*, *Amplypterus gannascus*, *Pseudosphinx tetrio*, some *Erinnyis*, *Pachylia ficus* and *resumens*, *Epistor lugubris*, *Pergesa lusca*, *Xylophanes pluto*, *chiron*, and *tersa*.

The temperate South of the Continent, which is much poorer in species and genera than the tropical districts, is characterised by the specialised genera *Neogene* and *Orecta*, which, though penetrating into the tropics, do not extend very far northward. There are further in this southern district, which reaches on the east coast to Espirito Santo and in the La Plata region to Tucuman and Paraguay, a number of species which have not been found farther north, besides some subspecies. We meet there with *Protoparce bergi*, *P. tucumana*, *P. diffissa petuniae* and *diffissa diffissa*, *P. manducoides*, *Hyloicus manra* and *justiciae*, several *Nyceryx*, *Chlaenogramma undata*, *Aleuron prominens*, *Xylophanes depuiseti*, *X. xylobotes*, *X. schausi*, *X. pistacina*, *X. isaon*, *X. aglaor*, *Hemeroplanes grisescens*, *Celerio enphorbiarum*, *Pholus satellitia analis*, *Enyo japyx discrepans*.

Chili has only two species of Hawk Moths—*Celerio annei* and *Protoparce sexta caestri*. *Herse cingulata* may also occasionally put in an appearance, but is not recorded.

The discrepancy in the Sphingid fauna of Central and South America, though many of the apparent differences in the composition of the fauna will most likely disappear on further research, is not inconsiderable. No species of *Euryglottis* has as yet been found in Central America, notwithstanding the species not being of rare occurrence in Colombia; *Protoparce stuarti*, *trimacula*, *scutata*, *petuniae*, *Hyloicus maura*, *justiciae*, *Pholus cissi*, *obliquus*, several *Protambulyx* and *Amplyterus*, and a number of *Xylophanes*, *Nyceryx*, *Madoryx*, etc., have not turned up in Central America; while *Protoparce dilucida*, *occulta*, *sesquiplex*, *muscosa*, *corallina*, *lanuginosa*, *crocata*, several *Hyloicus*, *Pholus typhon*, *Amplypterus donysa* and *ypsilon*, and some *Xylophanes* are not known from South America. Such differences as these are found everywhere between districts of wide extent, areas differing physiographically like the Andes and Brazil being naturally more or less different in the composition of the population, whether there ever has been a geographical barrier or not between the districts.

The lesser Antilles are rather imperfectly explored. The few species of *Sphingidae* known from there are widespread. It is, therefore, the more remarkable that the common *Protoparce rustica*, which ranges from Argentina northward to North America and the larger Antilles, has developed into a subspecies on the lesser Antilles as it has on the Galapagos Islands, while it does not vary geographically on the Continent and on the large West Indian islands. The occurrence of *Protoparce rustica harterti* on the lesser Antilles (inclusive of Bonaire and Curaçao, but exclusive of Trinidad) is an indication that more species may be represented by special races on these islands.

Several of the Neotropical *Sphingidae* were first described from the small islands of St. Christopher, Antigua, and St. Cruz. We have not seen any specimen from there.

The four larger West Indian islands, Cuba, Haiti, Porto Rico, and Jamaica, are not very different in their Sphingid fauna from Central America, and agree closely with that of the Bahamas and Florida. They form together a West Indian district, characterised by the absence of many Neotropical species and the occurrence of one genus and several species peculiar to them, besides several subspecies.

Apart from Florida, which has a number of North American *Sphingidae*, there is no Nearctic element in the district. An exploration of the Lepidopterous fauna of Cuba and Haiti is a desideratum, the material in collections being very scanty. The species occurring are distributed as follows, those peculiar to the district being marked with an asterisk (*). The subspecies in brackets are given in the list to show the distribution of the species outside the district. The North American species occurring in Florida are left out.

	Florida.	Bahamas.	Cuba.	Haiti.	Porto Rico.	Jamaica.	Occurrence outside the district.
Acherontiinae.							
Herse cingulata	×	×	×	×	×	×	N. and S. America.
Cocytius duentius	—	—	×	×	×	×	Neotropical R.
— duponchel	—	—	×	×	—	×	,, ,,
— antaeus antaeus	—	×	×	×	—	×	——
(— — *medor*)	—	—	—	—	—	—	Neotropical R.
**Protoparce sexta jamaicensis*	×	—	×	×	×	×	——
(— — *sexta*, etc.)	×	—	—	—	—	—	Nearctic and Neotr. R.
— afflicta	—	×	×	×	—	—	Amazons.
— rustica rustica	×	×	×	×	×	×	Neotropical.
(— — *harterti*)	—	—	—	—	—	—	Lesser Antilles.
*— *brontes brontes*	—	—	—	—	—	×	——
*— — *cubensis*	×	—	×	×	×	—	——
**Nannoparce poeyi poeyi*	—	—	×	—	—	×	——
(— — *haterius*)	—	—	—	—	—	—	Yucatan.
Ambulicinae.							
Protambulyx strigilis	—	—	×	×	×	×	Neotropical R.
*— *carteri*	×	×	—	—	—	—	——
Amplypterus gannascus	—	—	×	—	—	×	Neotropical R.
Sesiinae.							
Pseudosphinx tetrio	×	×	×	×	×	×	,, ,,
**Isognathus rimosa rimosa*	—	—	×	×	×	—	——
(— — *inclitus*)	—	—	—	—	—	—	Central Am.
(— — *pedilanthi*)	—	—	—	—	—	—	Venezuela.
*— *congratulans*	—	—	×	—	—	—	——
Erinnyis alope	×	×	×	×	×	×	Neotropical R.
*— *lassauxi f. meriamae*	×	—	×	×	×	—	Central America.
*— *ello*	×	×	×	×	×	×	Neotropical R.
*— *oenotrus*	×	—	×	—	×	×	,, ,,
*— *crameri*	—	—	×	×	—	×	,, ,,
*— *obscura*	×	—	×	×	×	×	,, ,,
*— *domingonis*	—	—	×	×	—	—	,, ,,
*— *guttularis*	—	—	×	×	—	—	——
Grammodia vacua	×	—	×	×	—	—	Neotropical R.
Pachylia ficus	×	×	×	×	×	×	,, ,,
*— *syces insularis*	—	—	×	×	—	×	——
(— — *syces*)	—	—	—	—	—	—	Neotropical R.
*— *resumens*	×	—	×	×	—	×	,, ,,

	Florida.	Bahamas.	Cuba.	Haiti.	Porto Rico.	Jamaica.	Occurrence outside the district.
Sesiinae—*continued.*							
**Madoryx pseudothyreus*	×	—	×	—	—	—	——
Hemeroplanes calliomenae	—	—	—	×	—	—	S. America.
— parce	×	—	×	×	—	—	Neotropical R.
Epistor lugubris lugubris	×	×	×	×	×	—	” ”
*— — *latipennis*	—	—	—	—	—	×	——
— occypete	—	—	×	×	—	×	Neotropical R.
**Himantoides undata*	—	—	—	—	—	×	——
**Cautethia noctuiformis*	—	—	×	×	×	—	——
*— *grotei*	×	×	—	—	—	—	——
**Perigonia dirisa*	—	—	×	—	—	—	——
— lusca f. lusca	—	—	×	—	—	—	——
— — f. interrupta	×	×	—	×	×	—	Neotropical R.
*— *lefebraei*	—	—	×	—	—	—	——
*— *jamaicensis*	—	—	—	—	—	×	——
*— *glaucescens*	—	—	—	×	—	—	——
Eupyrrhoglossum sagra	—	—	×	—	—	—	Neotropical R.
**Sesia blaini*	—	—	×	—	×	×	——
*— *tantalus zonata*	×	—	×	×	×	×	——
(— — *tantalus*)	—	—	—	—	—	—	S. America.
(— — *clavipes*)	—	—	—	—	—	—	C. and S. America.
— fadus	—	—	×	×	—	—	Neotropical R.
Philampelinae.							
**Pholus satellitia satellitia*	—	—	—	—	—	×	——
*— — *posticatus*	×	×	×	—	—	—	——
(— — *licaon*, etc.)	—	—	—	—	—	—	Neotropical R.
*— *strenua*	—	—	×	×	—	—	——
— vitis vitis	×	×	×	×	×	—	Neotropical R.
*— — *hesperidum*	—	—	—	—	—	×	——
— fasciatus	×	—	×	×	×	×	Neotropical R.
— labruscae	×	×	×	×	—	×	” ”
Choerocampinae.							
Xylophanes pluto	×	×	×	×	—	—	” ”
*— *irrorata*	—	×	×	—	—	—	——
*— *gundlachi*	—	—	×	—	—	—	——
*— *rhodocera*	—	—	—	×	—	—	——
*— *porcus porcus*	—	—	×	—	—	—	——
(— — *continentalis*)	—	—	—	—	—	—	Neotropical R.
— chiron chiron	—	—	—	—	—	×	——
— — *nechus*	×	×	×	×	—	—	Neotropical R.
— tersa	×	—	×	×	×	×	” ”
*— *suana*	—	×	—	—	—	—	——
*— *robinsoni*	—	—	×	—	—	—	——
**Celerio calverleyi*	—	—	×	—	—	—	——
— lineata lineata	×	×	×	×	×	×	Neotr. and Nearctic R.
(— — *livornica*)	—	—	—	—	—	—	Europe, Asia, Africa.
(— — *livornicoides*)	—	—	—	—	—	—	Australia.

Among the 22 genera and 60 species occurring are 1 genus, 20 species, and 11 subspecies peculiar to the district. The genus *Himantoides* is confined to Jamaica; it is closely allied to *Cautethia*, which is not found on Jamaica, but occurs on the other islands, as well as in Florida and Mexico. While Porto Rico, Haiti, and Cuba do not apparently differ except in the number of species, Jamaica has some specialities restricted to it. Besides *Himantoides undata*, we find in Jamaica *Protoparce brontes brontes*, *Epistor lugubris latipennis*, *Perigonia jamaicensis*, *Pholus vitis hesperidum*, *Pholus satellitia satellitia*,

Xylophanes chiron chiron, which are either absent from the other islands, or represented by other subspecies.

The Lepidoptera of the Galapagos Islands are almost entirely unknown. The fauna is very poor in Butterflies; but the Moths, especially the smaller kinds, seem to be fairly well represented. Dr. Holland, when describing the Galapagos subspecies of *Protoparce rustica*,* said that he had received larvae of five species of *Sphingidae*. In the Tring Museum there are six species of Hawk Moths from this group of islands: *Herse cingulata*, *Protoparce rustica calapagensis*, a new species of the same genus, a new subspecies of *Erinnyis obscura*, *E. ello*, and *Celerio lineata*. Some species of *Xylophanes*, and one or the other genus of *Sesiinae*—*Perigonia*, for instance—must be expected to occur.

The Sandwich Islands have six species of *Sphingidae*. *Protoparce quinquemaculatus blackburni* is a well-marked race of the common Nearctic "Potato-worm." *Tinostoma smaragditis* is a very peculiar specialisation of the Neotropical genus *Pholus*; as yet only one imperfect specimen is known of this remarkable insect. The other three species belong to the cosmopolitan genus *Celerio*. They are *Celerio lineata lineata*, identical with American specimens, and *Celerio calida* and *wilsoni*, which have their nearest relative in *Celerio annei* from Chili and Peru. The affinity of the Sandwich Island Sphingid fauna is, therefore, absolutely with America.

The *Sphingidae* of the **Nearctic Region** offer, we think, more interesting points in their distribution and relationship than those of tropical America. As said above, quite a number of Neotropical species extend into the warmer districts of North America, some going regularly or occasionally to New England. If we exclude this purely tropical material, which is foreign to the Nearctic Region proper (*Protambulyx strigilis*, *Pachylia ficus* and *resumens*, *Erinnyis alope* and *ocnotrus*, *Pseudosphinx tetrio*, *Xylophanes pluto*, *Perigonia lusca*, etc.), and deduct also *Herse cingulata* and *Celerio lineata lineata*, which occur everywhere in the New World, there remain 29 genera with 65 species. Among these there are again several which are Neotropical, but may be called inhabitants of the Southern States. *Pholus vitis*, *labruscae*, *Erinnyis ello*, *Epistor lugubris*, *Sesia fadus*, and *Xylophanes tersa* have a similar position in the North American fauna, as have *Acherontia atropos*, *Herse convolvuli*, and *Hippotion celerio* in the fauna of Europe. They are immigrants from the south. Two other Neotropical species have developed into Nearctic subspecies: *Pholus satellitia pandorus* and *Protoparce sexta sexta*. Among the rest there is one Holarctic species, represented in North America by one of its two subspecies (*Celerio gallii intermedia*). All the others are Nearctic, but all are derivations from tropical genera. We can group them in two sections, according to their origin—the one section containing specialisations of the Neotropical stock, the other the genera derived from the Old World stock. We add to the Neotropical section the Neotropical species which have settled in North America, north of Florida, in order to make the list complete:—

* *Proc. U. St. N. Mus.* xii. p. 195 (1889).

NEOTROPICAL SECTION.

Acherontiinae.

**Protoparce sexta sexta.* †
**— quinquemac. quinquemaculatus.*
**Chlaenogramma jasminearum.*
**Dolba hylaeus.*
**Isogramma lugeni.*
**Ceratomia amyntor.*
**— undulosa.*
**— catalpae.*
**Isoparce cupressi.*
**Dictyosoma elsa.*
**Atreus plebeja.*
**Hylaicus eremitus.*
**— eremitoides.*
**— separatus.*
**— chersis* (3 subsp. and 1 in Mexico).
**— vancouverensis.*
**— libocedrus* (2 subsp.).
**— perelegans.*
**— canadensis.*
**— francki.*
**— kalmiae.*
**— gordius* (2 subsp.).
**— luscitiosa.*
**— drupiferarum* (2 subsp.).
**— dolli* (2 subsp.).
**— sequoiae.*
**Lapara coniferarum.*
**— pineum.*
**— bombycoides.*
**— halicarniae.*

Ambulicinae.

No species.

Sesiinae.

Erinnyis ello.
Sesia fadus.
Epistor lugubris.
** Haemorrhagia thysbe.*
**— gracilis.*
**— diffinis* (3 subsp.).
**— bracci.*

Philampelinae.

Pholus labruscae.
**— satellitia pandorus.*
**— achemon.*
— vitis.

Choerocampinae.

Xylophanes tersa.

OLD WORLD SECTION.

Acherontiinae.

Herse cingulata.

Ambulicinae.

**Sphinx cerisyi* (4 subsp.).
**— jamaicensis.*
**Calasymbolus excaecata.*
**— myops.*
**— astylus.*
**Pachysphinx modesta* (2 subsp. and 1 in Mexico).
**Cressonia juglandis.*
(*Monarda oryx* in Mexico.)

Philampelinae.

**Ampelocca versicolor.*
**— myron.*
**Darapsa pholus.*
**Sphecodina abbotti.*
**Dëidamia inscriptum.*
**Arctonotus lucidus.*
(*— terlooi* in Mexico.)
**Amphion nessus.*
**Proserpinus gaurae.*
**— juanita* (2 subsp.).
**— clarkiae.*
**— flavofasciata* (3 subsp.).
**Euproserpinus phaeton.*
**— euterpe.*

Besides *Celerio lineata lineata* and *C. galli intermedia* of doubtful origin, being members of a truly cosmopolitan genus.

† The species and subspecies marked with an asterisk (*) are restricted to the Nearctic Region, or extend southward only in Mexico.

It will be observed that all the *Acherontiinae* except *Herse* are of Neotropical extraction, being derivations from *Protoparce*. One of these genera extends into the Palaearctic fauna (*Hyloicus*), and has given rise to another genus in N.W. India (*Thamnoecha*). The Atlantic *Lapara* is also a development of *Hyloicus*. The most generalised Nearctic species of *Hyloicus* are *eremitoides* and *separatus*; they are closely allied to those *Hyloicus* which are purely Neotropical (*geminus*, *lugens*, *istar*, etc.). We shall refer to this particular relationship again when discussing the Palaearctic *Sphingidae*. The Ambulicine genera of North America (as well as the Mexican genus *Monarda*) are all of the Old World branch of the subfamily, which branch begins with *Callambulyx*, itself not very far from the most generalised Ambulicine genus *Compsogene*, confined to the Indo-Malayan Subregion. *Sphinx* is common to North America and the Palaearctic Region, and has its older members in Central Asia (*Sphinx kindermanni* and *caecus*): one of the two Nearctic species is strongly specialised (*jamaicensis*). *Calasymbolus* is a derivation from *Sphinx*, and *Pachysphinx* and *Cressonia* (as well as *Monarda*) come also very near *Sphinx* and *Amorpha* (see pedigree of *Ambulicinae*).

The only Sesiine genus of North America which is not a recent immigrant from the South is *Haemorrhagia* with four species. It is distributed over the Palaearctic Region, and has one species in India and another on the Moluccas (Amboina, *venata*). The six genera of *Philampelinae* peculiar to the Nearctic Region are not nearly related to the Neotropical Philampeline genus *Pholus*, which represents an ancestral branch of the subfamily not occurring in the Old World, but are specialisations of Old World genera. *Ampeloeca* (*versicolor* and *myron*) and *Darapsa* (*pholus*) are very closely allied to *Ampelophaga* of the Oriental Region and Pacific Palaearctic Subregion, being, like the Syrian genus *Berutana*, derived from it. *Sphecodina*, *Deïdamia*, *Arctonotus*, *Amphion*, *Proserpinus*, and *Euproserpinus* have nothing to do with *Haemorrhagia*, with which they are generally associated in classification. They belong to the Afro-Oriental tribe *Nephelicae* of the *Philampelinae*.

North America has no species of *Choerocampinae* to itself, the three species occurring in the temperate districts being *Xylophanes tersa*, which is Neotropical, *Celerio gallii*, which is Holarctic, and *Celerio lineata*, which is cosmopolitan, the American subspecies *C. lineata lineata* extending over both New World Regions.

A few of the Nearctic genera reach southward into Mexico. *Dolba hylaeus* is represented in Mexico by a younger genus, *Dolbogene*, containing, like *Dolba*, only one species (*hartwegi*). One of the subspecies of *Sphinx cerisyi*, of *Pachysphinx modesta*, and of *Hyloicus chersis* occur in Mexico. *Hyloicus separatus* of Kansas, Colorado, and New Mexico is found also in Mexico. *Arctonotus terlooi* is an inhabitant of West Mexico, which is geographically very closely related to the arid parts of the South-western States: California, Arizona, Colorado, and New Mexico. Not one of the genera of Old World extraction extends farther south than Mexico.

The distribution of the Hawk Moths of North America illustrates a marked faunistic division of the Continent into an Atlantic and a Pacific Subregion. The Atlantic Subregion reaches westwards to the Mississippi plains and includes part of Texas. It contains far more Neotropical immigrants than the Western Subregion, Florida offering special facilities for a northward migration of the Neotropical *Sphingidae* of the West Indies, none of the Neotropical species which occur regularly or occasionally in Georgia, Carolina, etc., being absent from Cuba. The genera characteristic for the Atlantic Subregion are thirteen : *Dolba*, *Ceratomia*, *Isogramma*, *Isoparce*, *Atreus*, *Lapara*, *Ampeloeca*, *Darapsa*, *Deïdamia*, *Amphion*, *Calasymbolus*, and *Cressonia*, besides *Sphecodina*, which occurs, however, also in the Pacific district of the Palaearctic Region. The Atlantic Subregion is, therefore, rich in genera peculiar to itself, while the Pacific side of the Continent, from the Rocky Mountains to the Pacific Ocean, has only three genera restricted to itself (*Arctonotus*, *Euproserpinus*, and *Dictyosoma*). Of these western genera, *Aretonotus* and *Euproserpinus* are derivations from *Proserpinus*, and *Dictyosoma* from the Atlantic *Ceratomia*. The two Pacific species of *Proserpinus* and the only European one are more specialised than the two species which belong to the Atlantic Subregion. We have, therefore, the remarkable fact that what is characteristic for the Nearctic Region is essentially Atlantic. The Atlantic Subregion is the birthplace of the Nearctic Sphingid fauna. This is borne out by the two Holarctic genera *Sphinx* and *Haemorrhagia*, which have together five species in the Atlantic and only two in the Pacific Subregion of North America. This distribution gives a hint how to explain the glaring contrast existing between temperate and tropical America in the *Sesiinae* and *Choerocampinae*. One would have expected to find that, as is the case in *Acherontiinae*, the large Neotropical stock of *Sesiinae* had given rise to a crop of Nearctic specialisations, and that the Choerocampine genus *Xylophanes*, flourishing with fifty species in the Neotropical countries, had some special representatives in temperate North America. Temperature and other atmospheric factors as such cannot be the cause of the deficiency in the North American fauna, since the Sesiine genus *Haemorrhagia* is almost exclusively an inhabitant of the northern temperate countries of the Old and New Worlds ; since, secondly, the Palaearctic Region has eight species of *Choerocampinae* to itself, besides *Pergesa elpenor*, which reaches into India ; since, thirdly, temperate South America has several *Sesiinae* and *Choerocampinae* which do not go far north into the tropics ; and as, fourthly, the tropical plains as well as the temperate high mountainous districts of South and Central America are inhabited by *Sesiinae* and *Choerocampinae*. However, if it is hardly possible that conditions of life are at the root of the discrepancy, the paucity of *Sesiinae* in North America and the absence of any indigenous species of *Choeroca npinae* from that Region must find an explanation in the geographical history of the Western Hemisphere. The explanation is rendered complicated by the fact that there are no less than seven purely Nearctic genera of *Acherontiinae* which are of Neotropical extraction, and therefore apt to contradict any likely

explanation which takes cognisance only of the *Sesiinae* and *Choerocampinae*. The only plausible explanation is, we think, the following: South America was at an early period divided into an Atlantic and a Pacific Island (or Archipelago). The Atlantic Islands were in connection with what are now the West Indies, and these were continuous with the Atlantic portion of North America, which was likewise divided, by a broad sea corresponding to the Mississippi plains, into an Atlantic and a Pacific Island (or Archipelago). This Atlantic country was contiguous with the land north and east, and hence stood in connection with North Europe, perhaps as India and Australia are connected by an Archipelago. If we now assume that the *Sesiinae* and the ancestral *Xylophanes* were almost entirely restricted to the Pacific Island of what is now South America, while the *Acherontiinae* were essentially inhabitants of the Atlantic Neotropical Archipelago or Island, or there represented by some generalised genera, like the early *Protoparce*, *Amphimoea*, and *Cocytius*, it is evident that there was no barrier to prevent the *Acherontiinae* from entering the Atlantic Nearctic Islands, and crossing over the northern countries to North Europe and Asia, whereas there was little chance of the early *Xylophanes* and the *Sesiinae* reaching the Atlantic and northern countries.

The only northern Sesiine genus (*Haemorrhagia*) being a highly specialised one, and the tropical Old World genera *Cephonodes* and *Sataspes* being still more modified, speak for the distribution having taken place in the direction indicated; and the great percentage of elements of Old World descent in the Atlantic Sphingid fauna of North America corroborates the evidence adduced that there was a road of communication in the North between the Western and Eastern Hemispheres.

The Atlantic Nearctic *Sphingidae* extend in Canada partly westward, and meet the western species in British Columbia and Washington. The Rocky Mountains and the plateau west of them have no pronounced peculiarities in the Sphingid fauna. The only distinctive features of this central district, which ranks as a Subregion in other groups of animals, are a species of *Haemorrhagia* not found outside the area (*brucei*) and the subspecies *Haemorrhagia diffinis senta*.

The **Palaearctic Region** embraces Europe, North Africa, Syria, Central Asia, Persia and Afghanistan, North China, Amurland, and the three main islands of Japan. It is inhabited by 75 species of *Sphingidae*, belonging to 33 genera:—

7	genera and	52	species	are peculiar to the Palaearctic Region.
4	„ „	1	„	occur also in the New World.
1	genus	—		is found in the Nearctic and Oriental Regions.
13	genera and	16	„	occur also in the Oriental Region.
6	„ „	3	„	occur also in the Oriental and Aethiopian Regions.
—	„ „	2	„	occur also in the Aethiopian Region.
2	„ „	1	„	are cosmopolitan.
33	genera and	75	species.	

The comparatively large number of genera occurring in the Palaearctic Region is accounted for by the fact that many Oriental genera extend northward in single species. It is curious that this northward extension obtains here, as in the Nearctic Region, in the eastern district. The two cases are, of course, purely analogous. Tropical China being continuous with Amurland and India, and Formosa connecting with China the chain of islands running from Japan southward, there is a convenient bridge from the Tropics to Japan and Amurland. This close geographical connection between India and Japan explains the contrast in the relation of the Palaearctic countries with the Oriental Region on the one side and the Aethiopian Region on the other. Numerous Oriental species of Hawk Moths range northward into Amurland and Japan, while only three African ones reach Europe (*Acherontia atropos*, *Deilephila nerii*, and *Hippotion osiris*), besides the Afro-Oriental traveller *Hippotion celerio*, which comes to Western Europe most likely from the West Coast of Africa, like *Deilephila nerii*. The Sahara is an effective barrier between the Palaearctic and Aethiopian faunae.

The Oriental species which are found as such in Japan, North China, Corea, or Amurland cannot be counted as Palaearctic. *Acherontia styx*, *Oxyambulyx ochracea*, *Clanis bilineata*, *Cephonodes hylas*, *Acosmeryx naga*, *Macroglossum pyrrhosticta*, *corythus*, *faro*, *passalus*, *Gurelca masuriensis*, *Theretra nessus*, *pinastrina*, *Rhyncholaba acteus*, and also the Chino-Japanese *Parum colligata*, are outside the proper Palaearctic fauna. These elements are comparatively recent immigrants, and correspond to the Neotropical immigrants of North America. That the road by which they travelled is, however, an old one is proved by the numerous eastern Palaearctic genera, species, and subspecies which have their nearest relatives in the Oriental Region. Five species common to both Regions are represented in each by a different subspecies: *Psilogramma menephron*, *Phyllosphingia dissimilis*, *Marumba sperchius*, *Ampelophaga rubiginosa*, and *Langia zenzeroides*. The eastern Palaearctic species, *Callambulyx tatarinovi*, *Marumba gaschkewitschi*, *jankowskii*, *maacki*, *Oxyambulyx japonica*, *schauffelbergeri*, *Acosmeryx castanea*, *Rhagastis mongoliana*, and *Theretra japonica*, belong to Oriental genera; and *Dolbina exacta* and *tancrei* have near allies in North India in *Dolbina inexacta* and *Dolbinopsis grisea*, and *Hyloicus caligineus* in *Thamnoecha uniformis*. None of these Palaearctic species extend to Central Asia or Europe.

Of the remaining nineteen genera found in the temperate zone of the Eastern Hemisphere we may dismiss *Herse*, which is represented only by the wandering *H. convolvuli* occurring all over the Old World, inclusive of New Zealand, which no other Hawk Moth has reached. Three are restricted to the Pacific district: *Sphingulus*, *Kentochrysalis*, and *Sphecodina*. The last genus has only two species, one of them occurring in the Nearctic Region; the distribution is in so far curious as the Palaearctic species is Pacific and the Nearctic one Atlantic. The genus is a derivation from the Afro-Indian *Philampelinae*. *Kentochrysalis* and *Sphingulus*, together with *Dolbina*, belong

to the small tribe *Sphingulicae*, which has one more representative in North India (*Dolbinopsis*) and three in Australia (*Tetrachroa*, *Synoecha*, and *Hoplioenema*). These seven genera are all that is left of the tribe; perhaps a few more species than are known may be discovered in the Himalayan countries, China, and Australia. The tribe is probably very ancient, and had formerly a more uniform distribution in the Oriental Region, only remnants being now extant.

The difference between the Western and Eastern divisions of the Palaearctic Region is enhanced by Central Asia, Asia Minor, and Europe possessing five genera not occurring in Amurland and Japan. *Sphingonaepiopsis* is Palaearctic, Oriental, and African, and is, like the West Palaearctic and Nearctic *Proserpinus*, a derivation from the African *Philampelinae*. *Akbesia*, found only in Syria, comes nearest to the Aethiopian genus *Batocnema*. *Berutana* from Syria and Persia is a specialisation of *Ampelophaga* inhabiting India, China, Amurland, and Japan. *Rethera* of Central Asia and Afghanistan has its nearest ally in the Oriental Region, and is of Oriental extraction. To these genera we must add the African *Deilephila nerii* and *Acherontia atropos*, which do not occur in the eastern parts of the Palaearctic Region; and *Theretra alecto*, which has developed into a pale subspecies in Syria, occasionally occurring northward to the Caspian Sea, but rarely entering Europe.

There are now left to be discussed the genera ranging from Europe to Japan. *Macroglossum* has one species which is much specialised, and is nearest in characters to some Aethiopian ones, but may be a development from an Oriental species (of the group of *belis*). *Macroglossum stellatarum* occurs all over the Palaearctic Region, and goes southward into North-western India. *Hyloicus* is Palaearctic, Nearctic, and Neotropical; it is of American origin, and has five species in the Palaearctic fauna, three being restricted to the Pacific side (*caliginens*, *oberthueri*, and *crassistriga*) and two occurring from Spain to Japan (*pinastri* and *ligustri*), but having developed into a western and an eastern subspecies. *Mimas* comes from the Afro-Indian stock of *Ambulicinae*; it contains only one species, represented in the west and the east of the Region by a well-marked subspecies (*Mimas tiliae christophi* and *Mimas tiliae tiliae*). *Amorpha* is a development of the Oriental branch of *Ambulicinae*; its two species overlap in Russia and Transcaspia, *A. amurensis* ranging from Amurland to North Russia, and *A. populi* in three subspecies from Morocco, Spain, and Great Britain eastward to Central Asia and Asia Minor. *Sphinx* is likewise a derivation from Oriental *Ambulicinae* (*Callambulyx*); it has apparently come into Europe by way of Afghanistan and Persia, Central Asia possessing the most primitive member of the genus (*Sphinx kindermanni*), while Europe (*Sphinx ocellata*) and North America (*Sphinx jamaicensis*) have the most specialised ones. Europe and Japan have only one species of *Sphinx* each, while Central Asia has two, Amurland three, and North America two, besides the derivative genus *Calasymbolus*. *Haemorrhagia* is, like *Sphinx*, Holarctic, but has one species in India (*saundersi*), and another,

which deviates much from the rest of the species, in Amboina (*venata*). *H. fuciformis* occurs all over the Palaearctic Region, and reaches into India; it is separated into a western and an eastern subspecies; Amurland, China, and Japan have three species (*staudingeri*, *beresowskii*, and *radians*) not occurring in the western district, and *H. tityus* does not go farther east than the Alai Mountains, while *H. croatica* is confined to South-eastern Europe and adjacent districts, *ducalis* to Central Asia, *dentata* to Syria, and *rubra* to Kashmir. The genus *Celerio*, which is cosmopolitan, gives a special feature to the Atlantic half of the Palaearctic Region, where it is more abundantly developed than anywhere else on the globe. The genus is doubtless an old one, and had formerly more species in the tropics, the one each in Madagascar, Argentina, Chili-Peru, Cuba, and the two on the Sandwich Islands being remnants of a formerly less erratically distributed genus. The genus has given off two branches: *Rhodafra* in Southern Africa, and *Pergesa* in the Palaearctic Region. *Pergesa* has four Palaearctic species, one ranging from West Europe to Japan, China, and North India (*elpenor*), a second extending from West Europe to Central Asia (*porcellus*), a third occurring in Central Asia (*suellus*), and a fourth in Amurland and Japan (*askoldensis*). A fifth species of *Pergesa*, closely allied to *elpenor*, is found in North India (*vivularis*).

The marked difference in the composition of the Sphingid fauna of the Atlantic and Pacific Subregions of the Palaearctic Region is illustrated by the following tables of distribution, in which the purely Oriental species which range into Japan without having developed into Palaearctic subspecies are not mentioned:—

DISTRIBUTION OF THE GENERA OCCURRING IN THE PALAEARCTIC REGION.*

	Atlantic Subregion of Palaearctic R.	Pacific Subregion of Palaearctic R.	Oriental R.	Aethiopian R.	Nearctic R.	Neotropical R.	Descent of Genus.
Acherontiinae.							
Herse	×	×	×	×	×	×	Oriental.
Acherontia	×	×	×	×	—	—	Afro-Indian.
Psilogramma	—	×	×	—	—	—	Oriental.
Hyloicus	×	×	—	—	×	×	American.
Dolbina	—	×	×	—	—	—	Oriental.
**Kentrochrysalis*	—	×	—	—	—	—	,,
**Sphingulus*	—	×	—	—	—	—	,,
Ambulicinae.							
**Akbesia*	×	—	—	—	—	—	Aethiopian.
Oryambulyx	—	×	×	—	—	—	Oriental.
Maruamba	×	×	×	—	—	—	,,
Langia	—	×	×	—	—	—	,,
**Mimas*	×	×	—	—	—	—	Afro-Indian.
Callambulyx	—	×	×	—	—	—	Indian.
Sphinx	×	×	—	—	×	—	,,
Phyllosphingia	—	×	×	—	—	—	,,

* The purely Palaearctic genera are marked with an asterisk (*).

	Atlantic Subregion of Palaearctic R.	Pacific Subregion of Palaearctic R.	Oriental R.	Aethiopian R.	Nearctic R.	Neotropical R.	Descent of Genus.
Sesiinae.							
Haemorrhagia	×	×	×	—	×	—	American.
Philampelinae.							
Deilephila	×	—	×	×	—	—	Afro-Indian.
Ampelophaga	—	×	×	—	—	—	Oriental.
**Berutana*	×	—	—	—	—	—	,,
Acosmerycæ	—	×	×	—	—	—	,,
**Rethera*	×	—	—	—	—	—	,,
Sphingonaepiopsis	×	—	×	×	—	—	Aethiopian.
Sphecodina	—	×	—	—	×	—	Afro-Indian.
Proserpinus	×	—	—	—	×	—	,,
Macroglossum	×	×	×	×	—	—	,,
Choerocampinae.							
Celerio	×	×	×	×	×	×	Cosmopolitan.
**Pergesa*	—	×	×	—	—	—	Palaearctic.
Hippotion	×	×	×	×	—	—	Afro-Indian.
Theretra	×	×	×	×	—	—	Oriental.
Rhagastis	—	×	×	—	—	—	,,

DISTRIBUTION OF THE SPECIES OCCURRING IN THE PALAEARCTIC REGION.*

	Atlantic Subregion of Palaearctic R.	Pacific Subregion of Palaearctic R.	Oriental R.	Aethiopian R.	Nearctic R.	Neotropical R.
Acherontiinae.						
Herse convolvuli	×	×	×	×	—	—
Acherontia atropos	×	—	—	×	—	—
— styx	—	×	×	—	—	—
Psilogramma menephron	—	×	×	—	—	—
**Hyloicus ligustri ligustri*	×	—	—	—	—	—
**— — constricta*	—	×	—	—	—	—
**— crassistriga*	—	×	—	—	—	—
**— pinastri pinastri*	×	—	—	—	—	—
**— — morio*	—	×	—	—	—	—
**— caligineus*	—	×	—	—	—	—
**— oberthueri*	—	×	—	—	—	—
**Dolbina tancrei*	—	×	—	—	—	—
**— exacta*	—	×	—	—	—	—
**Kentochrysalis streckeri*	—	×	—	—	—	—
**— consimilis*	—	×	—	—	—	—
**— sieversi*	—	×	—	—	—	—
**Sphingulus mus*	—	×	—	—	—	—
Ambulicinae.						
**Oxyambulyx japonica*	—	×	—	—	—	—
— schauffelbergeri	—	×	—	—	—	—
**Marumba quercus*	×	—	—	—	—	—
— sperchius	—	×	×	—	—	—
**— jankowskii*	—	×	—	—	—	—
**— maacki*	—	×	—	—	—	—
**— gaschkewitschi*	—	×	—	—	—	—
Langia zenzeroides	—	×	×	—	—	—

* The species restricted to the Palaearctic Region are marked with an asterisk (*).

	Atlantic Subregion of Palaearctic R.	Pacific Subregion of Palaearctic R.	Oriental R.	Aethiopian R.	Nearctic R.	Neotropical R.
Ambulicinae—*continued.*						
**Mimas tiliae tiliae*	×	—	—	—	—	—
**— — christophi*	—	×	—	—	—	—
**Callambulyx tatarinovi*	—	×	—	—	—	—
**Sphinx kindermanni*	×	—	—	—	—	—
**— caecus*	—	×	—	—	—	—
**— ocellata*	×	—	—	—	—	—
**— planus*	—	×	—	—	—	—
**Anorpha populi*	×	—	—	—	—	—
**— amurensis*	×	×	—	—	—	—
Phyllosphingia dissimilis	—	×	×	—	—	—
Sesiinae.						
**Haemorrhagia tityus*	×	—	—	—	—	—
**— radians*	—	×	—	—	—	—
**— faciformis facif.*	×	—	—	—	—	—
**— — affinis*	—	×	—	—	—	—
**— beresowskii*	—	×	—	—	—	—
**— staudingeri*	—	×	—	—	—	—
**— croatica*	×	—	—	—	—	—
**— rubra* †	×	—	—	—	—	—
**— dentata*	×	—	—	—	—	—
**— ducalis*	×	—	—	—	—	—
Philampelinae.						
Deilephila nerii ‡	×	—	×	—	—	—
Ampelophaga rubiginosa	—	×	×	—	—	—
**Berutana kotschyi*	×	—	—	—	—	—
**Acosmeryx castanea*	—	×	—	—	—	—
**Rethera komarovi*	×	—	—	—	—	—
**Sphingomepiopsis gorgon*	×	—	—	—	—	—
**— kuldjaensis*	×	—	—	—	—	—
**Sphecodina caudata*	—	×	—	—	—	—
**Proserpinus proserpina*	×	—	—	—	—	—
**Macroglossum stellatarum* §	×	×	×	—	—	—
Choerocampinae.						
**Celerio euphorbiae* §	×	×	×	—	—	—
**— gallii*	×	×	—	—	×	—
**— nicaea* §	×	—	×	—	—	—
**— zygophylli*	×	—	—	—	—	—
**— vespertilio*	×	—	—	—	—	—
**— hippophaës*	×	—	—	—	—	—
— livornica	×	×	×	×	×	×
**Pergesa elpenor elpenor*	×	—	—	—	—	—
**— — lewisi*	—	×	—	—	—	—
(— — fraterna)	—	—	×	—	—	—
**— porcellus*	×	—	—	—	—	—
**— suellus*	×	—	—	—	—	—
**— askoldensis*	—	×	—	—	—	—
Hippotion celerio	×	×	×	×	—	—
(— osiris)	×	—	—	×	—	—
Theretra alecto	×	—	×	—	—	—
**— japonica*	—	×	—	—	—	—
**Rhagastis mongoliana*	—	×	—	—	—	—

7 genera and 23 species occur in the Atlantic Subregion.
12 „ „ 31 „ „ „ Pacific „
12 „ „ 12 „ are common to both Subregions.

† Kashmir.
‡ *D. nerii* extends into the Western Peninsula of India and Ceylon.
§ On the Oriental Region only in N.W. India.

The larger proportion of the genera and species occurring in the Palaearctic Region are of Oriental extraction. Those of the Atlantic Subregion have come over Afghanistan and Persia, those of the Pacific Subregion over China. Ten of the genera do not occur in the Oriental and Aethiopian Regions, to which number must be added *Haemorrhagia*, which is not of Tropical Old World origin, and *Dolbina*, which extends only into North India. Of the ten genera characteristic of the Palaearctic Region, two are of American descent (*Hyloicus* and *Haemorrhagia*). When discussing the Nearctic *Sphingidae*, we drew attention to the fact that the tropical *Hyloicus* are more generalised than the Nearctic ones. A similar phenomenon obtains in other genera. The European *Marumba quercus* is more specialised than the Oriental species of the genus and than *sperchius*. The Syrian *Akbesia* is more specialised than the Aethiopian *Batocnema*, its nearest ally. The youngest member of *Callambulyx* is the Palaearctic *tatarinovi*, the Oriental *rubricosa* being the oldest. The most aberrant species of *Sphinx* is the Nearctic *jamaicensis* (=*geminatus*), and the genus *Sphinx* has given rise in North America to the specialised genus *Calasymbolus*. Of the various subspecies of *Sphinx cerisyi*, the Mexican one is the most generalised. The American *Pachysphinx*, *Monarda*, and *Cressonia* are younger members of that same branch than is the Palaearctic *Amorpha*, and this is much more specialised than the Oriental *Callambulyx*. The Syrian genus *Berutana* and the Nearctic genera *Ampeloeca* and *Darapsa* are derivations from the Oriental genus *Ampelophaga*. The southern Palaearctic species of *Haemorrhagia* (*croatica*, *dentata*, *rubra*, *ducalis*) have kept the complete or nearly complete covering of scales to the wings, which the mimetic species have lost; the Atlantic Nearctic *Haemorrhagia gracilis* and *thysbe* are also more generalised than *diffinis* and *brucei*; and *Proserpinus gaurae* and *juanita* more than the Pacific species of the genus and its derivative *Euproserpinus*. The most specialised species of the cosmopolitan genus *Celerio* are Palaearctic, and the two genera which have branched off from *Celerio* are South African and Palaearctic. *Macroglossum stellatarum* is in structure and colour one of the most specialised species of this large Afro-Oriental genus. *Orecta*, inhabiting temperate South America, but extending beyond the Tropic of Capricorn, is a derivation from the essentially tropical genus *Amplypterus*. These cases show that the extratropical *Sphingidae* are derivations from a tropical fauna, and that specialisation is generally highest in the districts farthest from the original country.

There are some apparent exceptions which, on closer inspection, only prove the rule. *Dolba* of North America is more generalised than *Dolbogene* from Mexico; *Dolbina inexacta* from North India more specialised than *D. tancrei* from Amurland and Japan; *Thamnoecha* from North India more than the Palaearctic *Hyloicus*, and *Dolbinopsis* from North West India more than the essentially Palaearctic genus *Dolbina*. In all these cases the southern *Sphinx* is a derivation from the northern, these insects being acquisitions from the Temperate Zone, existing only in the borderlands of the Tropics.

The **Oriental Region** is not larger in extent than the Neotropical and

Aethiopian Regions; but, being almost exclusively tropical and very heteromorphic, has the largest number of *Sphingidae*. The richest in *Sphingidae* are the western districts, India and the larger Sunda Islands; farther east there is an obvious decrease in the number of species and genera, though Australia possesses some genera of its own, and has, like the other Papuan countries, many species which do not reach India. *Macroglossum* remains abundant in species almost everywhere except on the outlying islands. *Psilogramma menephron*, and several species of *Theretra*, *Hippotion*, and *Macroglossum*, are common from India to Queensland and the Solomon Islands. The 251 species which are known belong to 64 genera. The distribution is as follows:—

36 genera and 226 species are Oriental.
13 „ „ 20 „ occur also in the Palaearctic Region.
6 „ „ 3 „ „ „ „ „ and Aethiopian Regions.
6 „ „ 1 „ „ „ „ Aethiopian Region.
1 genus occurs in the Palaearctic and Nearctic Regions.
2 genera and 1 species are cosmopolitan.

The proportion between purely Oriental and not purely Oriental genera and species is: genera, 36 : 28; species, 226 : 21. The percentage of purely Oriental genera appears to be small from these figures, owing to the fact of all the genera found also outside the Oriental Region being included in the 28, though many of them are actually Oriental, especially those extending northward into the Pacific Subregion of the Palaearctic Region, as detailed above. To arrive at the correct figures, we have to separate the indigenous genera, which may have sent out some species beyond the limits of the Region, from the genera of extraneous extraction. For the sake of simplicity we shall distinguish only between tropical and northern temperate genera, leaving the discussion of the relation of the Oriental fauna with the Aethiopian till we are dealing with the latter.

The mountainous districts of North India and China have biological conditions favourable for species of the Palaearctic Zone. We find here several northern *Sphingidae* and members of Palaearctic genera—for instance, *Celerio euphorbiae* and *nicaea*, *Pergesa elpenor*, *Haemorrhagia fuciformis*, *Dolbinopsis grisea*, and *Thamnoecha uniformis*. *Phyllosphingia*, *Parum*, and *Dolbina* reach from Amurland or Japan to Assam or Sikhim. All the other genera common to the Palaearctic and Oriental Regions are tropical ones, the proportion of tropical to non-tropical genera of the Oriental Region being 58 : 6.

Only 7 genera out of the 64 occurring are derivations from the American stock (*Apocalypsis*, *Pseudodolbina*, *Coenotes*, *Thamnoecha*, *Haemorrhagia*, *Cephonodes*, and *Sataspes*). The Australian genus *Coenotes*, of which only one species is known, is, like the North Indian genus *Apocalypsis* and its derivative *Pseudodolbina*, a zoogeographical puzzle. *Coenotes* is very close to *Neogene* from Argentina and Brazil, and *Apocalypsis* equally near *Euryglottis* from tropical South America. The agreement between the

respective Oriental and Neotropical genera is so close that we must consider the relationship real.

The rest of 51 genera are endemic to the tropics of the Old World. Most of these genera are Indian. Their distribution shows that the division of the Oriental Region into a western and an eastern Subregion is not better established in the *Sphingidae* than in most other families of Lepidoptera. There is no line of division. The Papuan and the Indian elements, each taken as a whole, overlap. There are, however, two centres in the development of species in the Oriental Sphingid fauna: Continental India (inclusive of Burma and tropical China, of which the *Sphingidae* are very imperfectly known), and tropical Australia and the Papuan Islands. The Malay Archipelago, from the Malay Peninsula to the Moluccas and the Tenimber Islands, is exceedingly poor in species of its own, and possesses only one genus peculiar to itself, *Giganteopalpus*, of which the single species is as yet found only on Java, Sumatra, and Borneo. All the other Oriental genera which do not occur on the mainland are found only in Australia, not even in New Guinea, all the *Sphingidae* of the Papuan and Pacific Islands eastward to Fiji and Tahiti being members of genera ranging to India and partly to Africa. The island of Celebes has no single species of its own, and only two or three subspecies, which is very remarkable, considering that the island has a very distinctive population in many families of Lepidoptera and of other animals. Though the distribution of the *Sphingidae* over the Archipelago is not fully known, the following table will give an approximate idea of the extent of the Indian and Papuan species in the Archipelago. We leave out all the Indo-Chinese species which have not been found in the Archipelago, but add the Australian ones; to shorten the table, we exclude also the species common to both Subregions. The Papuan species are marked with an asterisk (*). The column "India" embraces Continental Asia as far as it belongs to the Oriental Region; the "Lesser Sunda Islands" comprise the islands from Lombok to Alor; the "Moluccas" the southern and northern Moluccas (Amboina, Ceram, Buru, Batjan, etc.); "Tenimber" includes the islands between Timorlaut and Wetter; and "Oceania" means the islands south and east of the Solomon Islands:—

	India.	Malacca.	Sumatra.	Borneo.	Philippines.	Java.	Lesser Sunda Is.	Timor.	Tenimber.	Celebes.	Moluccas.	Key.	Aru.	N. Guinea.	Australia.	Bismarck Arch.	Solomon Is.	Oceania.
Acherontiinae.																		
**Herse fasciata*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×
* — *luctifera*	—	—	—	—	—	—	—	—	×	—	×	×	—	×	—	—	—	—
* — *godarti*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
Acherontia styx	×	×	×	×	×	×	×	—	×	×	×	—	—	—	—	—	—	—
— *lachesis*	×	×	×	×	×	×	—	—	—	×	×	—	—	—	—	—	—	—
Meganoton nyctiphanes	×	×	×	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
**Leucomonia bethia*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
**Coenotes eremophilae*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
**Tetrachroa edwardsi*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
**Synoecha marmorata*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
**Hoplocnema melanoleuca*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—

	India.	Malacca.	Sumatra.	Borneo.	Philippines.	Java.	Lesser Sunda Is.	Timor.	Tenimber.	Celebes.	Moluccas.	Key.	Aru.	N. Guinea.	Australia.	Bismarck Arch.	Solomon Is.	Oceania.
Ambulicinae.																		
Compsogene panopus	×	×	—	×	×	×	—	—	—	—	—	—	—	—	—	—	—	—
Oxyambulyx bima	—	—	—	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—
— substrigilis	×	×	×	×	×	×	—	—	—	—	—	—	—	—	—	—	—	—
— meeki	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—
— rildei	—	—	—	—	—	—	—	—	—	—	—	—	—	×	×	—	—	—
— subocellata	×	×	×	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—
— semifervens	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—
— dohertyi	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	×	—
Metamimas australasiae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
Coequosa triangularis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
Clanis curoa	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—	—	—	—
Leucophlebia lineata	×	×	×	×	×	×	×	—	—	×	—	—	—	—	—	—	—	—
Polyptychus trilineatus	×	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—
Marumba dyras	×	×	×	—	×	×	—	—	—	—	—	—	—	—	—	—	—	—
— ambainicus	—	—	—	—	—	—	—	—	—	×	×	—	—	—	—	—	—	—
— spectabilis	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— timora	—	—	—	—	—	—	—	×	×	—	—	—	—	—	—	—	—	—
Daphnusa ocellaris	×	×	×	×	×	×	—	—	—	×	—	—	—	—	—	—	—	—
Smerinthulus terranea	—	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— quadripunctatus	—	—	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—
— dohrni	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Degmaptera olivacea	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Callambulyx rubricosa	×	×	×	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—
Sesiinae.																		
Haemorrhagia renata	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—
Cephonodes woodfordi	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	×	—
— janus	—	—	—	—	—	—	×	—	—	—	—	—	—	—	×	—	—	×
— hylas	×	—	—	—	—	—	×	×	—	—	—	—	—	—	×	—	—	—
— titan	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—
— picus	×	×	—	—	×	×	×	—	×	—	—	—	—	×	×	—	—	—
— armatus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×
— lifuensis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×
Sataspes infernalis	×	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— tagalica	×	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—
— ribbei	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—	—
Philampelinae.																		
Chromis heliodes	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—
Deilephila protrudens	—	—	—	—	—	—	—	—	—	—	×	—	—	—	×	×	×	—
Ampelophaga linigera	—	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—
Elibia dolichus	×	×	×	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—
Acosmeryx socrates	×	—	×	×	×	×	—	—	—	—	—	—	—	—	—	—	—	—
— miskini	—	—	—	—	—	—	—	—	—	—	—	—	—	×	×	—	—	—
Panacra micholitzi	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—
— husiris	×	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— splendens	—	—	—	—	—	—	—	—	—	—	×	—	—	×	×	—	×	—
— malayana	—	—	×	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—
— automedon	×	—	—	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—
— dohertyi	—	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— tiridates	—	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—
— variolosa	×	×	—	—	×	×	—	—	—	—	—	—	—	—	—	—	—	—
— aegon	×	×	×	×	×	×	×	—	—	—	—	—	—	—	—	—	—	—
Angonyx boisduvali	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—
— meeki	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—
Eupanacra rigens	—	×	—	×	×	—	—	—	—	—	—	—	—	—	—	—	—	—
— borneensis	—	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— labuana	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cizara ardeniae	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
Nephele didyma	×	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— subvaria	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—

	India.	Malacca.	Sumatra.	Borneo.	Philippines.	Java.	Lesser Sunda Is.	Timor.	Tenimber.	Celebes.	Moluccas.	Key.	Aru.	N. Guinea.	Australia.	Bismarck Arch.	Solomon Is.	Oceania.
Philampelinae—*continued.*																		
Gurelca hyas	×	—				×												
Sphingonaepiopsis pumilio	×	×																
Eurypteryx bhaga	×	—	×			×												
— malucca											×			×				
Gigantocopalpus mirabilis			×	×		×												
Macroglossum avicula	—	—																
— gyrans	×	—	×	×		×	×		×									
— vacillans	—	—	—	—		—	×	×	×									
— assimilis	×	—	—	—		×									×			
— fruhstorferi	—	—	—	—		×					×							
— culescens	—	—	—	—		—								×		×		
— castaneum	—	—	—	—		—											×	
— pyrrhosticta	×	—	×	—		×	×											
— troglodytus	×	—	—	—		×	×											
— alcedo	—	—	—	—		—						×		×	×			
— ungues	—	—	—	—	×	×	×			×	×							
— sitiene	×	—	—	—	×	—								×				
— stigma	—	—	—	—		—												
— heliophila	×	×	×	×	×	×					×							
— melas	—	—	—	—		—						×		×				
— albigutta	—	—	—	—		—											×	
— dohertyi	—	—	—	—		—					×			×				
— hirundo	—	—	—	—		—						×		×	×	×	×	×
— rectans	—	—	—	—		—								×	×			
— nubilum	—	—	—	—		—								×				
— godeffroyi	—	—	—	—		—										×		
— variegatum	×	—	×	—		—												
— glaucoptera	×	×	—	—		×												
— vidua	—	—	—	—		—								×				
— joannisi	—	—	—	—		—									×			
— semifasciata	×	—	×	—		×												
— aquila	×	×	×	×	×	×												
— sylvia	×	×	—	×	—	×				×								
— eichhorni	—	—	—	—		—												
— multifascia	—	—	—	×	—	×												
— hemichroma	×	—	—	×	×	×												
— faro	×	×	×	×	—	×												
— meeki	—	—	—	—	—	—								×				
— mitchelli	×	—	—	—	—	×												
— phocinum	—	—	—	—	—	—												
— barnensis	—	—	—	—	—	—					×							
— micacea	—	—	—	—	—	—								×	×			
— splendens	—	—	—	—	—	—					×			×	×	×		
Choerocampinae.																		
Celerio lineata	×	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
Hippotion echeclus	×	—	×	×	×	×	×	—	—	×	—	—	—	—	—	—	—	—
— rafflesi	×	—	×	—	—	×	—	—	—	×	—	—	—	—	—	—	—	—
— brennus	—	—	—	—	—	—	—	—	—	—	×	—	—	×	×	×	×	—
— scrofa	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
Theretra boisduvali	×	—	×	×	—	×	×	—	—	—	—	—	—	—	—	—	—	—
— queenslandi	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—
— incarnata	—	—	—	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—
— indistincta	—	—	—	—	—	—	—	—	—	—	—	—	×	×	—	—	—	—
— inornata	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—
— tryoni	—	—	—	—	—	—	—	—	—	—	×	—	×	×	—	—	—	—
— alecto	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— suffusa	×	×	×	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— lycetus	×	×	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—
— margarita	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—
— brunnea	—	—	—	—	×	—	—	—	—	—	×	—	—	—	—	—	—	—
— turneri	—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—

	India.	Malacca.	Sumatra.	Borneo.	Philippines.	Java.	Lesser Sunda Is.	Timor.	Tenimber.	Celebes.	Moluccas.	Key.	Aru.	N. Guinea.	Australia.	Bismarck Arch.	Solomon Is.	Oceania.
Choerocampinae—*continued.*																		
Theretra insignis †	—	—	—			×	—	—	×	—	—	—	—	—	—	—		
Rhyncholaba acteus	×	×	×	×	×	×	×	—	—	×	×	—	—	—				—
Rhagastis castor	—	—	—	—		×	—	—	—	—	—	—	—		—	—	—	—
— *acuta*	×	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— *albomarginatus*	×	—	×	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cechenena aegrota	×	×	—	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—
— *lineosa*	×	×	×	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
— *pollux*	—	—	×	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—

† Andamans.

Besides these 117 species,* there are 45 which occur from India to Papuasia. Only 26 species are peculiar to the area from Malacca to the Moluccas, and of these *Oxyambulyx semiferrens* and *Sataspes ribbei* are doubtfully distinct. Judging from the number of Papuan species described in this Revision, it is evident that further explorations will add substantially to the list of 58 *Sphingidae* peculiar to the Papuan Region. Of the 45 species common to both Subregions, no less than 15 have developed into a western and an eastern subspecies. The genera restricted to Australia are 7—namely, *Leucomonia*, *Coenotes*, *Tetrachroa*, *Synoecha*, *Hoplioenema*, *Metamimas*, and *Coequosa*. Of Papuan origin are probably also *Chromis* and *Angonyx*. It will be seen from the above table that the cosmopolitan genus *Herse* has its headquarters in Papuasia, where 4 species occur out of the 5 (*convolvuli* is not in the list). It was originally most likely Papuan, and took in Australia the place of the Indo-African genus *Acherontia*. Only *Herse convolvuli* has wandered beyond the Papuan Subregion. The American *Herse cingulata* may be a development from either *convolvuli* or *godarti*. There is morphologically rather more evidence for *godarti* than for *convolvuli* being the ancestor of *cingulata*; but geographically *convolvuli* has the advantage, since it does not require the construction of an Antarctic Continent to bring it into geographical connection with the range of *cingulata*.

The scarcity of indigenous species in the Malay Archipelago, from Malacca to the Moluccas, and the practical absence of genera restricted to these islands, and, further, the extension of Papuan species towards the west, and of Indian ones far towards the east, demonstrate that the Sphingid population has come to those islands by comparatively recent immigration from both sides. If we call to mind the erratic distribution of *Cephonodes hylas*, which is found (in three subspecies) in the Aethiopian Region, in India, China and Japan, and again in Australia and on Flores; of the two Oriental species of *Nephele*, which occur in India, Java, and Australia, of *Celerio lineata*, which inhabits Continental Asia and Australia, but not the Archipelago; of the *Sphingulicae*, which are restricted to

* *Eurypteryx shelfordi* described on p. 813 is not included in this number.

Australia and to North India and the Pacific Palaearctic Subregion * ; and couple these facts with the absence of indigenous genera from the Archipelago (except the Malayan *Gigantcopalpus*) and the scarcity of peculiar species, it becomes highly probable that one and the same cause lies at the bottom of these phenomena in distribution. The simplest explanation would be to assume that the Australian and Asiatic Continents were at an early period in the history of the *Sphingidae* at least as closely connected as they are now, the connection allowing of the Asiatic fauna extending into Australia, and that later the interjacent district became so far submerged that the fauna was practically destroyed. With the separation of Asia and Australia by a wide gap, the condition for the evolution of special genera and species was given in Australia. The reason for the seven endemic genera of tropical Australia not having migrated over the Papuan Islands may be purely biological ; or it is possible that at least two of them (*Leucomonia* and *Tetrachroa*) really do occur outside Australia, but have not yet been found.

The Indo-Malayan Subregion has twice as many species of *Sphingidae* as the Papuan Subregion, there occurring nearly 190 species, of which 150-odd do not extend into the Papuan countries. The cause of the contrast is easily perceptible. Papuasia is isolated from all Continents except Asia. Its entire Sphingid population is Indian in extraction, perhaps with the exception of *Coenotes*, which has closer affinities to the Neotropical *Neogene*. Since the greater proportion of the *Sphingidae* are swift-flying and of wide distribution, and as a good many exist under adverse climatical conditions, and hence prove themselves to be remarkably adaptive, it appears to us to follow that the Sphingid fauna of Australia would contain a good mixture of South American and African elements, if there had ever, within the history of *Sphingidae*, existed an Antarctic Continent connecting these countries with one another, and suitable for the existence of Hawk Moths. India and the neighbouring tropical districts of Asia, on the other hand, have had an influx from the North and West, and, being mountainous, offered at the same time the necessary conditions of life for the maintenance of a great variety of species. It is especially the North East of India, and most likely Burma and China—both of which are very imperfectly explored—that harbour the largest number of *Sphingidae*. South and West India are much poorer in *Sphingidae*, as is indeed the case with nearly all groups of Lepidoptera. Though the absence of very many of the Himalayan species and genera from Ceylon and South India is compensated for to a certain degree by the appearance of some forms which do not extend to Sikhim, Assam, and Burma, we emphasise that the Western Peninsula and Ceylon have very few species of their own and no genus peculiar to themselves, the differences being chiefly subspecific. The significance of this fact will be understood if we add that a few Palaearctic and African species reach into the Western Peninsula or the adjacent North Western districts (*Macroglossum stellatarum*, *Deilephila*

* The Australian *Papilio leosthenes*, which has its nearest relatives in Asia and Europe, may be mentioned in this connection.

nerii, *Haemorrhagia fuciformis*). Since there is no barrier to prevent these species from going farther east, it is manifest that the reason for their restriction to, and their occurrence in, South and West India is biological. That is to say, the Western Peninsula offers conditions of life suitable to those Palaearctic and African species, while the Central North and East of India do not. The differences between the West and North East are biological, most likely meteorological. There is nothing whatever in the composition of the Sphingid fauna (and of other families of Lepidoptera) to indicate that there ever was another road of communication between the Western Peninsula inclusive of Ceylon and Continental Africa than South Persia and Arabia, though the road may have been less barren.

The species which are common to the Oriental and Aethiopian Regions, besides the before-mentioned *Deilephila nerii*, which is decidedly African, are only four—namely, *Herse convolvuli*, *Cephonodes hylas*, *Celerio lineata livornica*, and *Hippotion celerio*. Two of them are wanderers, occurring nearly all over the Eastern Hemisphere (*Herse convolvuli* and *Hippotion celerio*); *Celerio lineata livornica* is also a wanderer, but does not go farther east than Continental Asia and Japan, *lineata* being absent from the Malay Archipelago and represented again by a special subspecies in Australia (*C. lineata livornicoides*); and *Cephonodes hylas* from the Aethiopian Region is subspecifically different from the Oriental *hylas*. It is evident that, apart from the three wanderers, no exchange has taken place within more recent date. Nevertheless, there is a close affinity between the two tropical Old World Regions dating from a more remote period, evidence of which is found in the genera *Acherontia*, *Clanis*, *Leucophlebia*, *Polyptychus*, *Sphingonaepiopsis*, *Deilephila*, *Nephele*, *Cephonodes*, *Hippotion*, and *Theretra*, which are found both in Africa and India. There are, besides, several Aethiopian genera which are close allies of Indian ones—for instance, *Pemba*, *Poliana*, *Maassenia*, *Rhadinopasa*; and the Oriental genus *Gurelca* is a derivation from *Temnora*, *Rhodosoma* of India comes close to *Hypaedalia* of West Africa, and the Aethiopian *Atemnora* is the prototype of *Macroglossum*, the fifty-one Oriental species of which are almost 25 per cent. of the total number of species of Oriental *Sphingidae*.

The **African** Sphingid fauna is as yet very imperfectly known. The proportion of undescribed species arriving from there is very large. We do not think the number of species and genera is much inferior to that of the Oriental fauna. There are as yet known 52 genera and 179 species,* of which 38 genera and 172 species are peculiar to the Aethiopian fauna, a proportionally very large number. *Acherontia atropos* and *Deilephila nerii*, which extend outside the Region, but are also Aethiopian in origin, must be added, making a total of 174 truly Aethiopian *Sphingidae*. The separation of the African Continent into a Western, a Southern, and an Eastern district is not very distinct in the Hawk Moths. The faunistic differences between the West African forest region and the drier and more open districts of the Eastern side of the Continent are biological

* *Hippotion aurora*, described on p. 812, is not included in this number.

in origin, and not caused by a geographical barrier having existed at an earlier epoch. Where the physiography of West Africa is similar to that of the Eastern districts, a similar fauna appears—as, for instance, in Angola and the Hinterland of Sierra Leone and of the Gold Coast; and where in East Africa there are extensive forests, insects of the West African type turn up. The genera *Polyptychus* and *Temnora* have very many species in West Africa and few in East Africa; but allowance must be made for the fauna of East Africa being less explored than that of the West Coast. The South of the Continent, from Capetown to Benguella and the Zambesi, is physiographically and faunistically similar to that of East Africa. There are, however, some species of Lepidoptera which do not go far northwards into the tropics. Of Hawk Moths, *Theretra capensis*, *Polyptychus mutata*, and *Oligographa juniperi* may be spoken of as being characteristic of this area. Some other species (*Rhodafra opheltes* and *marshalli*, *Temnora natalis* and *namaqua*, *Microsphinx pumilio*, *Leptoclanis pulchra*, etc.) are too rare to be safely regarded as being restricted to the South.

The differences between Madagascar and the Continent are very obvious. The Malagassic Subregion has 4 genera of its own (*Panogena*, *Lomocyma*, *Temnoripais*, *Maassenia*) and 26 species* and 6 subspecies restricted to itself, out of 23 genera and 44 species. We append a list of the species found in the Subregion, those confined to it being marked with an asterisk:—

	Occurrence outside the Malagassic Subregion.
Acherontiinae.	
Herse convolvuli	Old World.
Acherontia atropos	Africa; Europe.
Coelonia fulvinotata	Africa.
— solani	——
**Xanthopan morgani praedicta*	The other subsp. African.
**Panogena jasmini*	——
— lingens	——
**Lomocyma aegrapha*	——
Ambulicinae.	
**Batocnema coquerelli* (2 subsp.)	——
**Pseudoclanis gramlidieri*	——
**Polyptychus meander*	——
Sesiinae.	
Cephonodes hylas virescens	Africa.
— apus	——
— trochilus	——
— leucogaster	——
Philampelinae.	
Deilephila nerii	Africa; Europe; W. India & Ceylon.
**Maassenia heydeni*	——
**Nephele densoi*	——
— comma	Africa.

* *Hippotion aurora*, described on p. 812, is not included in this number.

	Occurrence outside the Malagassic Subregion.
Philampelinae—*continued.*	
**Nephele oenopion oenopion*	The other subsp. African.
*— — *stictica*	——
**Temnora grandidieri*	——
*— *marginata comorana*	The other subsp. African.
*— *famosa peckoveri*	„ „ „ „
*— *pulpulis*	——
**Temnoripais lasti*	——
**Sphingonaepiopsis obscurus*	——
Temnora westermanni	Africa.
**Macroglossum allnaudi*	——
*— *suror*	——
*— *milvus*	——
*— *aesalon*	——
*— *pachyceras*	——
Choerocampinae.	
**Celerio biguttata*	——
— *livata livornica*	Africa ; Europe ; Asia.
**Euchloron megaera lucasdairei*	The other subsp. African.
Basiothia medea	Africa.
*— *laticornis*	——
**Hippotion batschi*	——
*— *saclavorum*	——
*— *butleri*	——
— *balsaminae*	African.
*— *geryon*	——
— *osiris*	Africa.
— *eson*	Africa.
**Theretra orpheus intensa*	The other subsp. African.

The Malagassic *Sphingidae* are thoroughly African, the only species indicating an affinity with India not shared by the African Continent being *Hippotion geryon*, which is close to the Indo-Australian *velox*, and *Maassenia heydeni*, which stands intermediate between *Nephele* and the Oriental genus *Acosmeryx*. The existence of four species of *Cephonodes* in the Subregion and of five *Macroglossum*, while Africa has only one species of each genus, is a striking feature of the fauna, which, however, does not demonstrate a closer affinity with India or with Australia, but is the consequence of the Subregion being an Archipelago, and the wide separation of the islands offering a condition for the development of special species. The various species of *Cephonodes* and *Macroglossum*, indeed, do not occur over all the islands, and most of them are quite restricted in range. The similarity between the Malagassic and Oriental faunae is much inferior to that existing between the African Continent and India. However, the few affinities which there are, taken together with the presence of African genera in India, and of Oriental ones in Africa, prove a rather close connection between the Aethiopian and Oriental faunae, each having profited from the other. There is no such agreement between Africa and South America. These Continents have no genus in common except the two

cosmopolitan ones (*Herse* and *Celerio*). The affinity which there exists between the Neotropical and Aethiopian Regions is shared by India.

Since low types of all the subfamilies of *Sphingidae*, with the exception of the *Sesiinae*, occur in the tropics of the Western and Eastern Hemispheres, there is indeed a close affinity in this respect between the tropics of the Old and New Worlds. But the affinity constituted by the presence of allied low types has quite a different bearing on questions of geographical distribution from that affinity which is established by the occurrence of closely related specialised genera and species. Let us take, for instance, the *Acherontiinae* and *Ambulicinae*. The lowest African, Indian, and American genera *Xanthopan*, *Meganoton*, *Cocytius*, and *Protoparce* are as nearly related to each other as the younger derivatives *Hyloicus*, *Ceratomia*, *Thamnoecha*, etc.; and the generalised Ambulicine genera *Protambulyx*, *Amplypterus*, *Compsogene*, and *Oxyambulyx* are phylogenetically as closely connected as are the specialised genera *Sphinx*, *Amorpha*, *Pachysphinx*, *Phyllosphingia*, *Cressonia*, etc. The migration northwards and westwards into the Nearctic Region of the derivations from the ancestral Oriental *Ambulicinae*, represented by *Amplypterus* in the present epoch, and the extension of the derivations from the lowest Neotropical *Acherontiinae*, *Protoparce*, or an extinct genus similar to it, north and eastward into the Palaearctic Region as far south as the Himalayas, and, further, the modification of either branch into a number of genera, have required a long time. Since not one of the younger derivations from the Oriental *Ambulicinae* and African *Acherontiinae* occurs in South America, and none of the younger developments of the Neotropical branches of these subfamilies are found in Africa or India, though the younger developments have become distributed northward as widely as stated above, it is obvious that there was no direct connection between the Neotropical Region and Africa and India during that period in which the evolution and distribution of the younger members of the two subfamilies took place. That is to say, the time which has elapsed, since the African *Xanthopan* and the Neotropical *Cocytius*, or the Indian *Compsogene* and the Neotropical *Amplypterus*, closely allied though they are, became geographically separated, is more remote than that which elapsed since the Nearctic and Palaearctic Regions exchanged a number of specialised genera. The distribution of the other subfamilies confirms this conclusion. The generalised *Sesiinae* occur only in the Neotropical Region, not one species being peculiar to any other region, though one single specialised—the most highly specialised—branch has crossed to the Palaearctic Region, and established itself in two genera in the tropics of the Old World (*Sataspes*, *Cephonodes*). The oldest genus of *Philampelinae* is again Neotropical (*Pholus*). It is sharply separated from the rest of the subfamily, and the only one occurring in the Neotropical Region, besides a derivative from *Pholus* found on the Sandwich Islands (*Tinostoma*). All the other *Philampelinae* are of Old World extraction, and have partly migrated from the Eastern Hemisphere into the Nearctic Region. In both the *Sesiinae* and *Philampelinae* the geographical barrier between the Eastern and Western tropics must have been effective at a very

early period of the history of *Sphingidae*, since otherwise an interchange of the widely distributed genera, like the Old World *Philampelinae: Deilephila* and *Nephele*, and the New World *Sesiinae: Pseudosphinx*, *Erinnyis*, *Pachylia*, etc., would have been the unavoidable consequence of the presence of some kind of geographical bridge between tropical West and East. In the *Choerocampinae* we have again a similar kind of distribution. The Neotropical Region has only the genus *Xylophanes*, besides the cosmopolitan *Celerio* and a derivation from *Xylophanes*. All the eleven Old World generalised and specialised genera have been debarred from entering the New World, though they are quick flyers and mostly of wide distribution ; and the Neotropical genus *Xylophanes*, though very generalised, has no representative in the Eastern Hemisphere.

The affinity which exists between the Neotropical Region and the Tropics of the Old World is geologically remote, but phylogenetically close. The distinction between close blood-relationship in the faunae which means recent geographical connection, and close blood-relationship which indicates remote geographical relation of the countries, which distinction is clearly demonstrated by the distribution of the *Sphingidae*, is of the highest importance in studies of geographical distribution. The distinction is entirely effaced and the student led astray, if the genera are not studied and defined with the view of giving in the classification adequate expression to the phylogeny of the family.

We divide the *Sphingidae* into the following groups : –

A. *Sphingidae asemanophorae.*—p. 3.
- Subfamily **Acherontiinae.**—p. 4.
  - Tribe **Acherontiicae.**—p. 4.
  - Tribe **Sphingicae.**—p. 27.
  - Tribe **Sphingulicae.**—p. 154.
- Subfamily **Ambulicinae.**—p. 166.

B. *Sphingidae semanophorae.*—p. 347.
- Subfamily **Sesiinae.**—p. 349.
  - Tribe **Dilophonoticae.**—p. 352.
  - Tribe **Sesiicae.**—p. 372.
- Subfamily **Philampelinae.**—p. 475.
  - Tribe **Philampelicae.**—p. 475.
  - Tribe **Nephelicae.**—p. 498.
- Subfamily **Choerocampinae.**—p. 672.

II. SYSTEMATIC SECTION.

Family SPHINGIDAE.—Typus: *Sphinx ocellata*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim).
Sphinges Scopoli, *Intr. Hist. Nat.* p. 413 (1777) (partim).
Sphingides Latreille, *Hist. Crust. Ins.* xiv. p. 126 (1805) (partim); Leach, in Brewst., *Edinb. Encycl.* ix. p. 130 (1815).
Sphingidae Samouelle, *Ent. Comp.* p. 243 (1819); Westw., *Brit. Moths* i. p. 5 (1843); Walk., *List Lep. Ins. B.M.* viii. p. 76 (1856) (descr. of Sphing. of the globe); Butl., *Trans. Zool. Soc. Lond.* ix. p. 511 (1877) (revis. of Sphing.); Smith, *Trans. Amer. Ent. Soc.* xv. p. 49 (1888) (monogr. of N. Amer. Sphing.); Kirby, *Cat. Lep. Het.* i. p. 624 (1892); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 65 (1892); Bartel, in Rühl, *Grossschm.* ii. p. 11 (1899) (descr. of Palaearct. Sphing.).
Sphingidae + *Sesiidae* Stephens, *Illustr. Brit. Ent., Haust.* i. p. 104 (1828).
Sphingidi Boisduval, *Ind. Meth.* p. 32 (1829) (catal. of Eur. Sphing.).
Sphingiadae Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 290 (1839) (monogr. of N. Amer. Sphing.).
Sphingidae + *Orthidae*, Swainson & Shuckard, *Hist. Nat. Arrang. Ins.* p. 101 (1840).
"Sphingides" Boisduval, *Spec. Gén. Lép. Hét.* i. p. 1 (1875) (monogr. of Sphing.).

Egg globular or slightly flattened, almost smooth, without distinct excrescences, the structure being microscopical.

Larva cylindrical, or tapering in front, third and fourth segments often swollen; skin covered with setiferous granules, or smooth, the granules often present only in first stage; segments ringed; head rounded or triangular, apparently always rounded in first stage, sometimes first rounded, then triangular, and again rounded in last stage (*Ellema*, see also *Clanis*); eleventh segment with horn, which is occasionally replaced by a button-like knob, horn longer in first than in later stages, often carried upright or leaning forward in first stages and movable at will, bifid in first stages, or at least with two apical setae, varying in structure from being covered with large setiferous tubercles to being nearly smooth.

Pupa: segments 5 and 6 of abdomen movable (three joints); tongue-case reaching to end of wing-cases, or shortened, often compressed, cariniform, enlarged basally or projecting free, sometimes rolled in spirally; sides of abdomen generally more strongly sculptured than dorsal and ventral parts of sommites, stigmatical area mostly transversely ribbed or carinate; cremaster very variable, bifid as a rule, often with spines and hooks. Free in a cell in the ground, or in a very loose cocoon on the surface between leaves, or beneath surface, seldom spun up on branch of food-plant (*Calliomma*).

Imago varying in length of body from 12 to 80 mm., and in length of forewing from 10 to 90 mm. (*Sphingonaepiopsis obscurus* and *Cocytius antaeus*).—Tongue varying from being several times as long as the body to being reduced to two small tubercles.—Pilifer clothed with bristles or scales, the brush even, or the bristles short at apex, or absent.—Genal process naked, mostly triangular, very often reaching to tip of pilifer.—Labrum convex in middle, often raised into a rather prominent tubercle.—Palpus very variable in size and structure; first segment with or without patch of sensory hairs on inner surface at base; inner surface of second segment scaled or partly naked, sometimes excavate; scaling

at apex of first segment externally sometimes forming a kind of cavity ; third segment mostly short, always shorter than second is broad, naked and conical if very prominent.—Eye variable in size, naked ; *no ocelli*.—Scaling of head often raised to a crest, especially in forms with reduced head.—Antenna filiform, setiform, or clavate, prismatically compressed or cylindrical, tapering at end, and mostly curved to a hook, sometimes pectinated ; end-segment long or short, scaled dorsally, the scaling mostly dense and forming often a dorsal tuft projecting distad, or sparse and rough, or almost absent. There are often long bristles on the end-segment, two at and near the tip, and several scattered over the surface of the segment ; the whole dorsal surface of antenna scaled, two rows of scales to each segment, but the rows quite irregular, proximal segments scaled also ventrally in a few cases where the clubbed antenna is very thin basally. Ventral surface densely clothed with fine hairs ; besides, there are some subdorsal and lateral sense-bristles, not obvious except on distal segments ; a single ventral mesial sense-cone on each segment, apical or subapical. ♂ : with one exception (*Rhopalopsyche*), the segments impressed at the sides and provided basally, dorsally, and apically along the groove with a row of fasciculated long hairs, the proximal row of hairs of either side continuous ventrally, but the hairs always shorter in and near the ventral mesial line, the distal rows seldom extended to the mesial line. Sometimes the dorsal edge of the groove widened laterad to a process which bears the fasciculated hairs on the underside at the edges. In two other genera the basal and distal edges of the grooves are ventro-laterally produced into a process each—*i.e.* into two processes on each side of the segment, the compressed processes bearing the fascicles at the upper and ventral edges. ♀ : without fasciculated hairs as a rule ; however, there are many forms in which the segments resemble those of the ♂, but the fasciculated hairs and the pectinations are not so long, and the grooves not so deep.—Sterna : parasternum of mesosternum large, epi- and hyposternum fused together, sternum and peristernum separate ; suturale of mesomerum swollen.—Abdomen : first tergite shorter than second, a mere linear stripe in *Macroglossum*, tergites 2 to 8 (♂), or 2 to 7 (♀), and sternites 2 to 6 (♂, ♀) or 2 to 5 (many ♀ ♀) armed at end with *spines*, variable in number, size, and chitinisation, spines of tergites generally stronger than those of sternites, the latter often without spines. Some forms have the tergites spinose all over, while the spines are wanting in others. ♂ *always* with tuft of long (scent-distributing) hairs in groove above upper edge of sternite of second segment (sternite of first segment absent, or probably fused with that of second).—Legs : sternal (= frontal) part of coxae not carinate except close to trochanter ; meral part of midcoxa reaching farther dorsad than sternal part, the coxo-meral suture slanting ; hinder edge of meral part of midcoxa, or of mid- and hindcoxa obtusely rounded, or carinate, or triangularly produced into a sharp tooth : trochantine distinct ; forecoxa in ♂ often with strongly developed scent-organ ; tibiae simple or spinose, foretibia often ending in a thorn or claw ; midtibia with two apical spurs, which are sometimes much reduced ; hindtibia with two pairs, or the proximal pair absent ; the spurs occasionally spinose, in a few cases the spines long and arranged in a single row, comb-like ; tarsi with four ventral rows of spines, often with additional spines, especially on outer surface ; not rarely some or many of the spines absent, and some developed to prominent hooks ; 4th row of midtarsus and 3rd of hindtarsus often basally developed into a prominent comb ; fifth segment with two (seldom four) long dorsal terminal bristles ; pulvillus present or absent ; paronychium with two pairs or one pair of lobes, or vestigial ;

claws simple.—Frenulum and retinaculum present or absent ; an elongate subbasal patch of glossy, modified, scales on forewing below behind SM^2, on hindwing above before C.—Neuration ; forewing : no areole ; SC^1 and SC^{2+3} before apex of cell, SC^2 and SC^3 on a long stalk, free part of SC^2 very weak and short, and mostly absent (individually variable) ; SC^3 ending close to apex of wing, sometimes continued along edge and joining SC^1 at apex, SC^5 from SC^1 at about one-third the way from cell to apex, R^1 from upper angle of cell or shortly stalked with SC^{4+5} ; R^2 from below centre of apex of cell, but always well above angle ; M^1 before angle of cell, M^2 in or near middle of cell ; SM^1 absent, SM^3 forming fork at base with SM^2 ; upper angle of cell more distal than lower angle.—Hindwing : C and SC^2 separate, connected with one another by a conspicuous slanting bar (= SC^1) in or near middle of cell ; SC^2 or (seldom) R^1 ending at farthest point of wing ; R^1 from upper angle of cell, often from SC^2 ; R^2 in or near centre of cell, never from lower angle ; R^3 and M^1 separate, or (seldom) stalked ; SM^1 absent.—Genital armature of ♂ : tenth segment simple or divided, the tergite as well as the sternite, the latter often without process, the segment asymmetrical in several instances. Claspers very variable in size and shape, often with a patch of friction-scales dorsally on outer surface, the number of such scales sometimes reduced to one, in many cases this organ quite absent ; in some *Ambulicinae* a corresponding organ on innerside of eighth tergite. Armature of clasper very variable according to species and genera, sometimes the two sides different. Penis-sheath and penis-funnel also much diversified in the family.—Genital armature of ♀ : vaginal aperture generally surrounded with ridges, processes, or folds, but often lacking special armature, occasionally asymmetrical in position.

Distribution : all regions except the antarctic zone, reaching northward to Lapland, southward to New Zealand and Patagonia, most plentiful in the tropics.

The bulk of the species of this family is easily recognised by their peculiar and well-known habitus, but some might easily be passed over as Notodonts. An examination of the antenna, abdomen, and neuration will show their true position.

II. A. *Sphingidae asemanophorae.*

First segment of palpus without patch of short sensory hairs on the inner surface near base.

II. B. *Sphingidae semanophorae.*

First segment of palpus with a patch of short sensory hairs on the inner surface near base.

II. A. Sphingidae asemanophorae.

The patch of sensory hairs is absent from the palpus in all the species. The friction-scales of the ♂ lie flat upon the clasper.* The tendency of development in this section of the family is reduction of organs, leading to the disappearing of the tongue, frenulum and retinaculum, pulvillus and paronychium, of the proximal pair of spurs of the hindtibiae, the friction-scales of the ♂, the meso- and metatarsal combs, and the abdominal spines, the most reduced forms representing the highest stages of development. The bristles of the pilifer become rather often modified into scales, or disappear almost entirely in a few instances.

* Except middle ones of *Poliana buchholzi* ; see p 39.

Larvae cylindrical, or slightly tapering in front, but then granulose; head large and rounded, or triangular, always rounded in first stage.—Cosmopolitan.

Here belong the subfamilies Acherontiinae and Ambulicinae.

Subfamily **Acherontiinae**.—Typus: *Acherontia atropos*.

Manducae Hübner, *Verz. bek. Schm.* p. 138 (1822) (partim).
Sphingini Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 161 (1865) (partim; *nom. nud.*).
"Achérontides" Boisduval, *Spec. Gén. Lép. Hét.* i. p. 4 (1875).
"Euryglottides" id., *l.c.* p. 58 (1875) (partim).
Acherontiinae Butler, *Trans. Zool. Soc. Lond.* ix. p. 517 (1877).
Sphinginae id., *l.c.* (1877) (partim).

Owing to the frequent reduction or obliteration of a number of organs in this subfamily and the *Ambulicinae*, there is no single distinguishing character applying to all species. The two subfamilies can, however, be separated by taking several characters together, as explained under *Ambulicinae* (see this subfamily).

The subfamily is divided into three tribes, of which the third comes very near the *Ambulicinae* in several respects: *Acherontiicae*, *Sphingicae*, *Sphingulicae*.

Tribe **Acherontiicae**.—Typus: *Acherontia atropos*.

Manducae Hübner, *l.c.* (1822) (partim).
"Achérontides" Boisduval, *l.c.*
Acherontiinae Butler, *l.c.*

♂♀. Palpus on the innerside without basal patch of short sensory hairs; second segment *impressed, this cavity covered by a roof of long scales* (Pl. LX. f. 1). Labrum raised to form a rounded carina, which is highest mesially. Tongue strong, either longer than the body or shorter than the thorax—in the latter case (*Acherontia*) very stout. Genal process very small. Second segment of palpus considerably shorter than the first, third small; first externally with deep apical cavity in sealing in *Megacorma*. Antennal segments impressed laterally in ♂; subprismatic, with the sides rather rounded in ♀, distal segments compressed, in transsection elongate-elliptic, in side-view subserrate dorsally as well as ventrally; end-segment *long* and thin, with long scales and bristles. Abdominal tergites and sternites with several irregular rows of spines at the apical margins. Spurs of tibiae unequal, hindtibia with two pairs; pulvillus present or absent; paronychium with two lobes or one on each side.

♂. Scent-organ of anterior coxa present, but not always conspicuous. Tenth abdominal tergite long, more or less pointed. Clasper rough with short spiniform setae near the apex of the harpe; the patch of friction-scales on the outer side, if present, large, consisting of multidentate scales; apical edge of clasper with bristles, which are sometimes (*Coelonia*) short and stout, spiniform. Harpe short, divided into two or three processes, the upper process armed at the edge with long teeth in *Megacorma*.

♀. In front of the vaginal orifice there is a flap, rounded, truncate, or divided.

Larva cylindrical, head and first segments smaller; a green and a black form with intergradations; thorax sometimes (*Coelonia*) with humps. Larva of *Megacorma* not known.—Food: *Solanaceae*, *Convolvulaceae*, seldom *Euphorbiaceae*.

Pupa: tongue-sheath free and recurved in *Herse*, free and not recurved in *Coelonia*, not free in *Acherontia*, always reaching to end of wing-cases. The pupa of *Megacorma* is not known, but has doubtless a free tongue-case.

Hab. Cosmopolitan; one species in America and ten in the Eastern Hemisphere.

This small tribe is a derivation from the following one, with which it is closely connected through *Coelonia* and *Xanthopan*. The relationship between *Acherontia* and the genera with which it is here united to one group has never been noticed before. *Acherontia* occupies in the classification of all authors quite an isolated position. *Herse* and *Coelonia* have been considered generically identical either with *Protoparce* or with *Hyloicus*, and the Sphinx here called *Megacorma* as a near ally of the common Oriental *menephron*, standing in Kirby's catalogue under *Meganoton*. When studying the structure of the species in question, we were struck by the great similarity between *Acherontia* and the Aethiopian Sphinx described as *Protoparce fulvinotata*, named below *Coelonia*. In fact, *Acherontia* is nothing else but a derivation from *Coelonia*; it is a *Coelonia* with a short and stout tongue. This conclusion, derived from the comparison of the structure and of the wing-pattern, is born out by the caterpillar, which has in both *Acherontia* and *Coelonia* the well-known tuberculated --shaped horn. Now, *Coelonia* shows close affinities in the pattern and structure of the imago with *Xanthopan*—and we have no doubt also in the caterpillar, which, however, is not yet known of *Xanthopan*,—a genus of *Sphingicae* in which even the peculiar structure of the inner surface of the second palpal segment (described above) is indicated rudimentarily. And the relationship of *Xanthopan* with other genera of *Sphingicae*, e.g. with *Panogena* and *Cocytius*, is unmistakable. We have, therefore, a gradation from the *Sphingicae* through *Xanthopan* and *Coelonia* to *Acherontia*, the Death-head Moths being the most highly specialised of this series. *Herse* (*convolvuli*, *cingulata*, etc.) is an offshoot from this branch, and so is *Megacorma*, both of which agree with the other two genera of *Acherontiicae* closely in the specialisation of the second palpal segment. In *Herse* and *Acherontia* a further specialisation obtains, which is largely observed again among the *Sphingicae*, namely, the reduction of the pulvillus of the tarsal claw-segment. The paronychia, too, lose their ventral and long lateral flaps in *Acherontia*. The humped thorax of the larva of *Coelonia* is very significant. We shall see that among the lower *Sphingicae*, from which the *Acherontiicae* are derived, a similar structure of the larva occurs.

The cavity at the end of the first palpal segment of *Megacorma* is a singular character which does not occur again among the *Sphingidae asemanophorae*, while it is found in many Old-World species of *Sphingidae semanophorae* belonging to *Theretra* and allied genera. Such parallel development is met with everywhere in the present family, and shows at what peculiar results a classifier will arrive who bases his judgment on one organ only. *Acherontia* is another instance: here the palpi do not touch one another, and therefore do not conceal the base of the tongue; the same is the case in several genera related to *Theretra*.

Keys to the genera:

A. Imago.

a. Tongue shorter than the thorax, the latter above with skull-mark . . . . . III. *Acherontia*.

Tongue longer than the body, thorax without skull-mark . . . . . *b*.

b. First segment of palpus externally with large apical cavity formed by the scaling . . . . . II. *Megacorma.*
Scaling of palpus normal . . . . . *c.*
c. Pulvillus not obviously reduced; ground colour of hindwing yellow, abdomen with yellow patches . IV. *Coelonia.*
Pulvillus of tarsal claw-segment vestigial, or at least very small, ground colour of hindwing not bright yellow, abdomen without yellow lateral patches . I. *Herse.*

B. Pupa (not known of *Megacorma*).
a. Tongue-sheath not free . . . . . *Acherontia.*
,, free . . . . . *b.*
b. ,, not recurved . . . . . *Coelonia.*
,, recurved . . . . . *Herse.*

C. Larva (not known of *Megacorma*).
Horn —-shaped, thorax without humps . . . *Acherontia.*
,, ,, with ,, . . . *Coelonia.*
Horn simply curved, thorax without humps . . *Herse.*

We believe—if prophesying is admissible—that the larva of *Megacorma* will turn out to have humps and a horn with an upward curve.

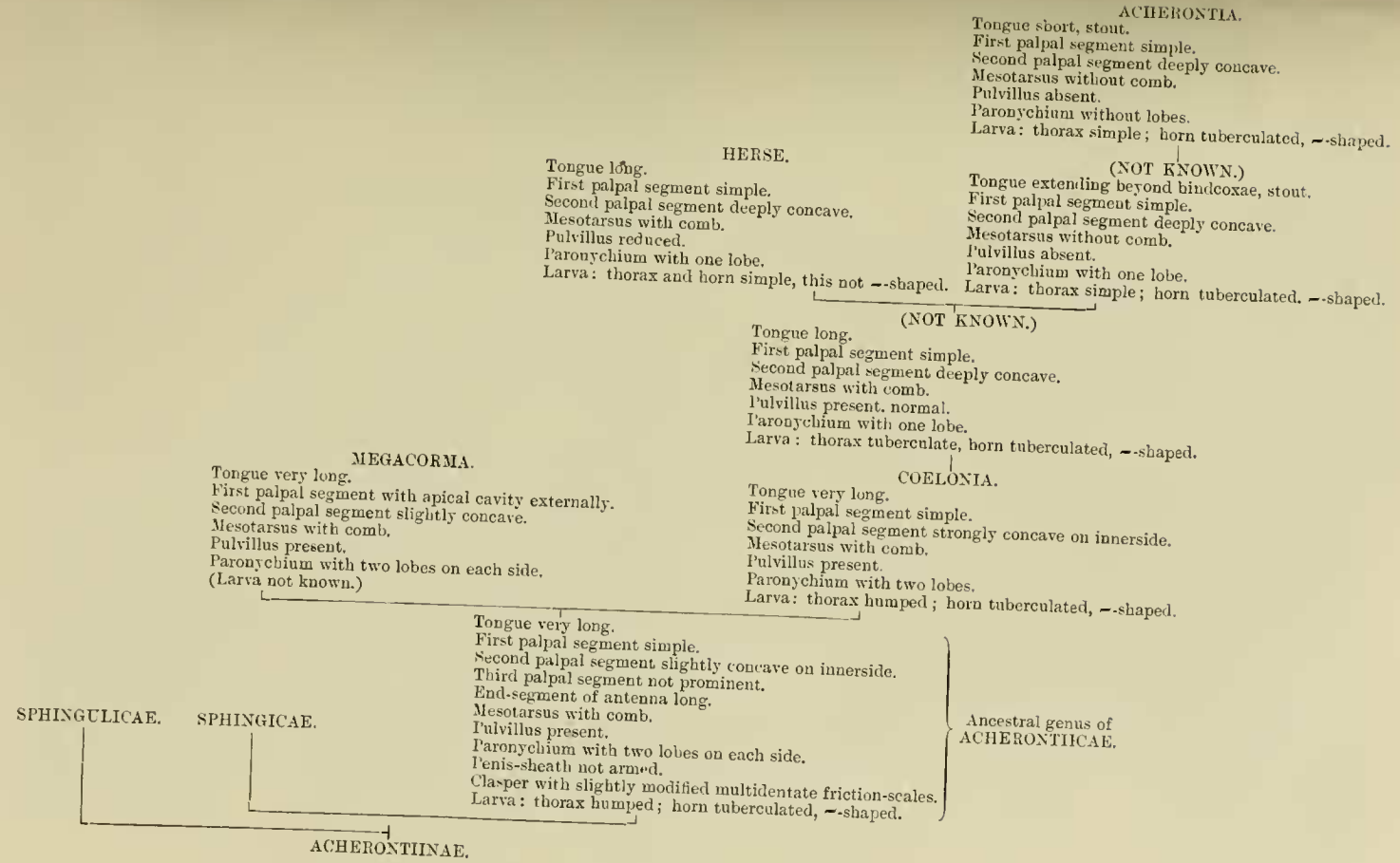
I. HERSE—Typus: *convolvuli.*

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim).
Herse Oken, *Lehrb. Naturg.* iii. p. 762 (1815) (partim; type: *convolvuli*).
Agrius Hübner, *Verz. bek. Schm.* p. 140 (1822) (partim).
Protoparce, Butler (*non* Burmeister, 1856), *Trans. Zool. Soc. Lond.* ix. p. 606 (1877) (partim); Moore, *Lep. Ceylon* ii. p. 4 (1882); Hamps., in Blanf., *Fauna Brit. India, Moths* i. p. 103 (1892).
Phlegethontius, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 687 (1893).

The species united here under Oken's generic term are all closely allied with one another in structure and pattern. They show close affinities to *Coelonia* and *Acherontia*, and have nothing to do with *Protoparce* (type: *rustica*), or with *Phlegethontius* (= *Cocytius*).

♂ ♀. Tongue very long, strongly thinning apicad. Palpus without cavity in the scaling at the end of the first segment externally, second segment about a quarter shorter than the first; inner surface of first longitudinally impressed; cavity of second deep, covered by a conspicuous roof of scales (Pl. LX. f. 1). Antenna almost equal in width from near base to near hook in ♂, slightly clubbed in ♀. Tarsi slender; foretarsus with several prolonged external spines; mid- and hindtarsus with basal comb of bristles; posterior tibia longer than first tarsal segment; pulvillus very small, paronychium with *one* lobe at each side instead of two, the smaller ventral lobes obliterated. Scaling of antennae white from base to tip.

♂. Procoxal scent-organ not strongly developed. Tenth abdominal tergite more or less dilated before end (Pl. XXVI. f. 15-18), apex pointed, compressed; sternite membranaceous, without lobe, continuous with the anal cone, which is long. Clasper sole-shaped, rounded, dilated dorsally before end, this portion curved inwards, inner surface with long bristles, except near apex of harpe, where the bristles are short and stout, spine-like. Harpe rather short, with two distal lobes, one above the other, both curving upwards and inwards, the upper one always pointed, the lower one spatulate or also pointed. Penis-sheath much thicker than in *Acherontia*, without armature. A patch of large multidentate scales on clasper.


ACHERONTIA.
Tongue short, stout.
First palpal segment simple.
Second palpal segment deeply concave.
Mesotarsus without comb.
Pulvillus absent.
Paronychium without lobes.
Larva: thorax simple; horn tuberculated, —-shaped.
HERSE.
Tongue long.
First palpal segment simple.
Second palpal segment deeply concave.
Mesotarsus with comb.
Pulvillus reduced.
Paronychium with one lobe.
Larva: thorax and horn simple, this not —-shaped.
(NOT KNOWN.)
Tongue extending beyond bindcoxae, stout.
First palpal segment simple.
Second palpal segment deeply concave.
Mesotarsus without comb.
Pulvillus absent.
Paronychium with one lobe.
Larva: thorax simple; horn tuberculated. —-shaped.
(NOT KNOWN.)
Tongue long.
First palpal segment simple.
Second palpal segment deeply concave.
Mesotarsus with comb.
Pulvillus present. normal.
Paronychium with one lobe.
Larva: thorax tuberculate, horn tuberculated, —-shaped.
COELONIA.
Tongue very long.
First palpal segment simple.
Second palpal segment strongly concave on innerside.
Mesotarsus with comb.
Pulvillus present.
Paronychium with two lobes.
Larva: thorax humped; horn tuberculated, —-shaped.
MEGACORMA.
Tongue very long.
First palpal segment with apical cavity externally.
Second palpal segment slightly concave.
Mesotarsus with comb.
Pulvillus present.
Paronychium with two lobes on each side.
(Larva not known.)
Tongue very long.
First palpal segment simple.
Second palpal segment slightly concave on innerside.
Third palpal segment not prominent.
End-segment of antenna long.
Mesotarsus with comb.
Pulvillus present.
Paronychium with two lobes on each side.
Penis-sheath not armed.
Clasper with slightly modified multidentate friction-scales.
Larva: thorax humped; horn tuberculated, —-shaped.
Ancestral genus of ACHERONTIIDAE.
SPHINGULICAE.
SPHINGICAE.
ACHERONTIINAE.

♀. A small flap in front of the vaginal aperture (Pl. XXII. f. 4. 5).

Larva: a green and a brown form, sometimes almost black, very variable; horn (of adult) simply curved, nearly smooth: head similarly striped with black as in *Acherontia* and *Coelonia*.—Food-plants: *Convolvulus*, *Ipomoea*.

Pupa with free, recurved, tongue-case; in a cell in the ground.

Hab. Cosmopolitan; four species in the eastern, one in the western hemisphere.

Key to the species:

a.	A yellow tuft at each side of the metanotum .	2. *H. luctifera*.
	No yellow tuft at each side of the metanotum . .	*b*.
b.	Abdominal tergites white at base with large black patches at sides, hindwing dark brown with a pinkish tint on the interspaces between the black bands . . .	1. *H. fasciatus*.
	Abdominal tergites with buffish lateral patches, hindwing pale buff between the black bands, the black discal band narrower, not double	3. *H. godarti*.
	Abdominal tergites with red or rosy red patches	*c*.
c.	Hindwing rosy red, discal black band not divided	4. *H. cingulata*.
	Hindwing dull grey, without red, discal band more or less double	5. *H. convolvuli*.

1. Herse fasciatus.

**Sphinx fasciatus* Rothschild, Nov. Zool. i. p. 94 (1894) (Lifu;—Mus. Tring); id., *l.c.* iii. t. 13. f. 9 (1896).

♀. Similar to the following, but easily distinguished by the absence of yellow spots from the metanotum, the strongly marked black lines on the seventh tergite, and the peculiar vinaceous tint both on body and wings. The rounded flap before the vaginal aperture as in *luctifera*.

There is no stigma on the forewing, the antemedian and discal lines are barely vestigial, the traces of the external discal line consist of long, thin, almost longitudinal, streaks which form very acute angles upon the veins; a long, thin, black streak R^3—M^1, a similar one behind M^1 mostly rather faint; a large, blackish brown, postmedian costal cloud. The external discal band of the underside of the hindwing is dentate. The black mesial line of the abdomen, above, is sharply marked; the seventh tergite has, besides, a black line on each side corresponding to the black lateral patches of the other segments.

Early stages not known.

Hab. Lifu, Loyalty Islands; 5 ♀♀ in the Tring Museum.

2. Herse luctifera.

**Macrosila luctifera* Walker, *List Lep. Ins. B.M.* xxxi. p. 35 (1864) (N. Guinea; Mysol; Ceram;—Mus. Oxford).

Pseudosphinx (?) *luctifera*, Butler, *Trans. Zool. Soc. Lond.* ix. p. 610. n. 3 (1877).

**Protoparce schmeltzi* Butler, *Ann. Mag. N. H.* (5). x. p. 158 (1882) (Australian Region;—Brit. Mus.).

Pseudosphinx luctifera, Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 32. n. 127 (1892) (N. Guinea, *type*; Ceram; Dorey; Morty).

Meganoton (?) *luctifera*, Kirby, *Cat. Lep. Het.* i. p. 683. n. 12 (1892).

Phlegethontius schmeltzi, id., *l.c.* p. 688. n. 17 (1892) (Oceania).

**Phlegethontius lixi* Rothschild, Nov. Zool. i. p. 94 (1894) (Nicura, Brit. N. Guinea;—Mus. Tring).

**Protoparce triangularis* Holland, Nov. Zool. vii. p. 556. n. 155 (1900) (Buru;—coll. Holland).

♂ ♀. A fairly constant species, which reminds one of the Neotropical *Protoparce maura* on account of the yellow metanotal tufts. Besides this tuft on the metanotum there is present in *luctifera* a smaller yellow spot on each side at the end of the mesonotum. The bases of the abdominal tergites are white laterally; the black mesial line is marked, but not very strongly. The stigma of the forewing is distinct, white; the antemedian and discal lines are more or less dentate, the inner discal one and the outer antemedian one more pronounced; a curved post-discal band of patches. The hindwing shaded with blackish brown all over, the abdominal region more or less grey, the black bands not distinct, more clearly marked posteriorly. Lines of forewing more distinct in ♂ than in ♀.

♂. Tenth abdominal tergite more triangular than in the other *Herse*, much less dilated before end (Pl. XXVI. f. 18). Both processes of the harpe (Pl. XXXV. f. 6) curved upwards and pointed, the lower one the shorter, the armature resembling that of *cingulata*.

♀. Flap in front of the vaginal orifice nearly as in *cingulata*, more strongly chitinised than in *convolvuli*; no obvious tubercles at the sides of the aperture.

Early stages not known.

Hab. Southern Molucceas to New Guinea; probably all over the Papuan subregion.

In the Tring Museum 7 ♂♂, 4 ♀♀ from: Amboina; Stephansort and Huon Golf, German N. Guinea; Milne Bay, British N. Guinea, i. iii. iv. 1899 (A. S. Meek); Nicura, British N. Guinea (Lix).

3. Herse godarti.

Sphinx godarti Macleay, in King, *Surv. Austr.* ii. p. 464. n. 166 (1827).
Diludia (?) *godarti*, Butler, *Trans. Zool. Soc. Lond.* ix. p. 615. n. 13 (1877).
(?) *Linneria eremitus*, id., *ibid.* p. 620. n. 1 (1877).
Protoparce abadonna, Kirby (*non* Fabricius, 1798), *Trans. Ent. Soc. Lond.* p. 238 (1877) (Queensld.; = *godarti*); id., *Proc. Zool. Soc. Lond.* p. 271. t. 27. f. 3 (1886); Misk., *Proc. Roy. Soc. Queensld.* viii. p. 23. n. 39 (1891) (partim; Brisbane; Rockhampton).
Sphinx distincta Lucas, *Queensland-r* xxxix. p. 894 (1891, May); Misk., *l.c.* p. 64 (1891) (= *abadonna*).
Phlegethontius abadonna, Kirby, *Cat. Lep. Het.* i. p. 690. n. 40 (1892) (partim; Austral.).
Phlegethontius (?) *distincta*, Kirby, Nov. Zool. i. p. 38 (1894).

The Fabrician *abadonna* is *convolvuli* as pointed out by Aurivillius, *Ent. Tidskr.* xviii. p. 153. n. 83 (1897).

♂ ♀. The buffish colour of the sides of the abdomen and of the hindwing, as well as the simple and narrow black discal band of the latter, distinguish this species at a glance from *convolvuli*. First protarsal segment with three long curved spines. ♂ darker on forewing than ♀.

♂. Tenth abdominal tergite in shape midway between those of *cingulata* and *convolvuli*, dorsally less impressed than in either of them. Both processes of the harpe (Pl. XXXV. f. 7) pointed as in *cingulata* and *luctifera* (and *fasciatus* most likely, of which the ♂ is not known); the ventral process as short as in *luctifera*, but the upper one more evenly curved; ventral margin of clasper produced into a short process near the harpe, this process rough with setiferous tubercles.

♀. Not dissected. Early stages unknown.

Hab. Queensland and N.W. Australia.

In the Tring Museum 2 ♂♂, 1 ♀ from: "Queensland"; Coomooboolaroo,

Duaringa, N. Queensland (A. S. Meek), and Townsville (Dodd). In the British Museum and the Hope collection at Oxford from N.W. Australia, neighbourhood of Sherlock River.

4. Herse cingulata.

Merian, *Ins. Surin.* t. 64. fig. infer. (1719).

Sphinx convolvuli var., Drury, *Illustr. Ex. Ins.* i. p. 54 & Index, t. 25. f. 4 (1770) (St. Christopher); Cram., *Pap. Ex.* iii. p. 55. t. 225. f. 1 (1782); Abbot & Smith, *Lep. Georgia* p. 63. t 32 (*L., p., i.*) (1797); Fabr., *Syst. Ent.* p. 544. n. 27 (1775) (snb syn.); id., *Spec. Ins.* ii. p. 150. n. 46 (1781) (snb syn.); id., *Mant. Ins.* ii. p. 97. n. 50 (1787) (syn. cit.); id., *Ent. Syst.* iii. 1. p. 374. n. 54 (1793) (sub syn.); Esper, *Schmett.* ii. p. 53 (1779) (sub syn.); Walk., *List Lep. Ins. B.M.* viii. p. 212. n. 1 (1856) (sub syn.); Moore, in Horsf. & Moore, *Cat. Lep. Mus. E.I.C.* i. p. 267. n. 616 (1857) (sub syn.); Misk., *Proc. Roy. Soc. Queensl.* vii. p 23. n. 38 (1891) (sub syn.); Meyrick, *Fauna Hawai.* i. 2. p. 193 (1899); Dyar, *Canad. Ent.* xxxii. p. 156 (1900) (Hawaii).

Sphinx cingulata Fabricius, *Syst. Ent.* p. 545. n. 29 (1775) (Am.); id., *Spec. Ins.* ii. p. 151. n. 48 (1781); id., *Mant. Ins.* ii. p. 97. n. 52 (1787); Gmel., *Syst. Nat.* i. 5. p. 2386. n. 164 (1790); Fabr., *Ent. Syst.* iii. 1. p. 375. n. 56 (1793) (Am. mer.); Harris, in Silliman, *Journ. Science & Art* xxxvi. p. 293. n. 1 (1839) (Middle & South. States); Burm., *Sphing. Bras.* p. 69 (1856); Walk., *List Lep. Ins. B.M.* viii. p. 215. n. 3 (1856) (Jamaica; St. Domingo: Mexico); Lucas, in Sagra, *Hist. Cuba* vii. p. 296 (1857) (Cuba); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lep.* p. 90 n. 1490 (1857) (Brazil; Sandwich Is.); Morris, *Cat. Lep. N. Am.* p. 18 (1860); Lintn., *Proc. Ent. Soc. Phil.* iii. p. 650 (1864) (good descr. of larvae); Herr.-Sch., *Corresp. Bl.* v. p. 59 (1865); (Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 69. (1865) (Cuba); Boisd., *Cons. Lép. Guatemala* p. 74 (1870); id., *Spec. Gén. Lép. Hét.* i. p. 95. n. 32 (1875); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 346 (1876) (Surinam); Dew, *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Pt. Rico); Burm., *Descr. Rép. Argent. V. Lép.* p. 322. n. 3 (1878); id., *Ic. Atlas* p. 31. t. 12. f. 1. 6 (1879) (larva, pupa); Grey, *Canad. Ent.* xi. p. 140 (1879) (Albany Co., N.Y., June 2nd).

Sphinx affinis Goeze, *Ent. Beytr.* iii. 2. p. 215 n. 41 (1780).

Agrius cingulatus, Hübner, *Samml. Ex. Schm.* ii. t. 165 (1806–); id., *Verz. bek. Schm.* p. 140. n. 1507 (1822).

Macrosila cingulata, Clemens, *Journ. Ac. Nat. Sc. Phil.* iv. p. 164 (1859); id., in Morris, *Syn. Lep. N. Am.* p. 188 (1862); Grote, *Proc. Ent. Soc. Phil.* vi. p. 329 (1866) (Cuba); id., *Trans. Am. Ent. Soc.* iii. p. 185 (1870) (Cuba); id., *Can. Ent.* iii. p. 101 (1871) (Alabama); Thaxt., *Psyche* i. p. 30 (1874) (Mass., vii. one specim.); Grote, *Bull. Buffalo Soc. N.H.* ii. p. 227 (1875) (N. York to Cuba); Gundl., *Contr. Ent. Cubana* p. 211. n. 100 (1881) (Cuba); Moff., *Can. Ent.* xiii. p. 256 (1881) (Long Point, Can.); Albr., *Ent. News* vi. p. 145 (1895) (Los Angeles).

Sphinx drurai Donovan, *Brit. Ins.* xiv. p. 1. t. 469 (1810); Steph., *Ill. Brit. Ent., Haust.* i. p. 120 (1828) (England, imported).

Sphinx pungens Eschscholtz, in Kotzebue, *Reise* iii. p. 218. t. 11. f. 28 (1821).

Phlegethontius cingulata, Grote, *Bull. Buffalo Soc. N.H.* iii. p. 224 (1877); Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 158 (1880) (larva); Fernald, *Can. Ent.* xvi. p. 21 (1884) (Maine, ix., 2 specim.); id., *Sphing. N. Eagl.* p. 35 (1886) (Orono, viii.); Grote, *Hawk Moths N. Am.* p. 40 (1886) (West Indies northw. to Canada); Edw., *Bull. U.S.N. Nat. Mus.* p. 47 (1889) (liter. rel. to transf.); Kirby, *Cat. Lep. Het.* i. p. 689. n. 35 (1892); Dyar, *Ent. News* vi. p. 95 (1895) (life hist.; Honolulu); Bönningh., *Iris* xii. p. 110. n. 1 (1899) (Rio de Jan.).

Protoparce cingulata, Butler, *Trans. Zool. Soc. Lond.* ix. p. 608. n. 18 (1877) (Jamaica; Haiti; N. Granada; Mexico); id., *Proc. Zool. Soc. Lond.* p. 484. n. 63 (1878) (Jamaica); Smith, *Trans. Am. Ent. Soc.* xv. p. 170. t. 8. f. 9 (genit.) (1888); Trum., *Ent. News* vii. p. 29 (1897) (S. Dakota); Pit. & Bioll., *Lep. Het. Costa Rica* p. 11 (1897) (Irazu; Candelaria); Hamps., *Ann. Mag. N. H.* (7). vii. p. 251 (1901) (Nassau, Baham.).

Macrosila (*Sphinx*) *cingulata*, Mann, *Psyche* ii. p. 75 (1877) (liter. rel. to metam.).

Sphinx (*Protoparce*) *cingulata* var. *decolora* Edwards, *Papilio* ii. p. 11 (1882) (Indian R., Florida, in colls. Edw. & Neumoeg.); id., *Bull. Am. Mus. N.H.* iv. p. 170 (1892) (Indian R.).

Protoparce cingulata var. *decolorata* (!), Smith, *Trans. Am. Ent. Soc.* xv. p. 170 (1888).

♂ ♀. Some of the older writers on Lepidoptera considered this to be a variety of *convolvuli*, and quite recently the same opinion has been advanced by a few authors, who—most likely—did not compare the insects side by side. In appearance

cingulata comes certainly near *convolvuli*, but there are many points in which the two differ more than *cingulata* and *godarti*. For instance, the latter two agree in both processes of the harpe being pointed, in the pulvillus of the tarsi being strongly reduced, in the black median band of the hindwing being simple. Moreover, the tenth abdominal tergite of the ♂ of *godarti* stands intermediate between those of *cingulata* and *convolvuli*, so that one might consider *cingulata* with as much reason a New World representative of the Australian *godarti* as a representative of *convolvuli*, which inhabits nearly the whole eastern hemisphere including Australia.

Metanotum with a buffish white lateral tuft which is not distinctly tinged with pink. The discal lines of the forewing, which is broader than in *convolvuli*, are much less deeply zigzag than in that species ; the series of postdiscal ovate markings is nearly complete, reminding one of *luctifera*. The black discal band of the hindwing is simple, but includes a more or less distinct pale spot at SM^2 ; the basal and antemedian black bands form an irregular ring, the basi-abdominal portion of which is much blacker than in *convolvuli*. End of the white palpus as well as upperside of head also darker. Palpus : Pl. LX. f. 1, inner side.

The antemedian band of the hindwing touches often the discal one behind M^2. The red colour of the abdomen and hindwings seldom disappears entirely (ab. *decolora*) ; intergraduate specimens are not so rare. An individual (♀) from Costa Rica in the Tring Museum has barely a trace of red on the hindwing, while the red colour of the lateral patches of the abdomen is much reduced in extent. No specimens have as yet been observed in which the red colour was replaced by clayish yellow.

♂. Procoxal scent-organ with longer hairs than in *convolvuli*. Tenth tergite of abdomen much more dilated before end, broadly impressed above (Pl. XXVI. f. 17). Both processes of the harpe pointed, sometimes of nearly equal size (Pl. XXXV. f. 5), generally the lower one shorter and more obtuse.

♀. The groove in front of the vaginal flap found in *convolvuli* is absent from *cingulata* ; the low ridge behind the orifice is mesially less tuberculiform, being more evenly arched.

Larva as variable as that of *convolvuli*, which it resembles.—Food-plant : *Ipomoea*.

Pupa with recurved free tongue-case. Burmeister, *l.c.*, figures the chrysalis as having the tongue-case not recurved ; this is clearly a mistake, or the individual from which the sketch was taken was abnormal. Merian's figure of a chrysalis on Plate LXIV. resembles that of Burmeister ; this is strange.

Hab. America, except the extreme south and the far north ; a tropical and subtropical insect, rarer in temperate regions, occurring as a straggler as far north as Canada ; Galapagos and Sandwich Islands.

In the Tring Museum 170 odd specimens from various places from Canada to Argentina, besides some larvae and pupae.

5. Herse convolvuli.

Hoefnag., *Archetypa* i. t. 8 (1592) ; id., *Divers. Ins.* t. 5 (1630) ; Mouf., *Theatr. Ins.* p. 91. f. 1 (1634) ; Hollar, *Dic. Ins.* t. 3. f. 1 (1646) ; Goed., *Metam.* iii. p. 34. f. v. (*l.*) (1669) ; id., *Ins.* ed. Lister p. 36. f. 27 (*l.*) (1682) ; Merian, *Eur. Ins.* ii. t. 25 (1683) ; Réaum., *Hist. Ins.* i. p. 292. t. 13. f. 8 (1734) ; Swamm., *Bibl. Nat.* p. 223. t. 29 (1738) ; Roes., *Ins. Belust.* i. 1. p. 49. t. 7. f. 5 (1746) ; Wilke, *Engl. Moths* p. 9. t. 21 (1747) ; Rösel, *Insect. Belust.* iii. p. 35. t. 6 f. 3 (1755) ; Hemmerich, *Coll. Curious Ins.* t. 6. f. a (175 ?, no date) ; Geoffr., *Hist. Nat.*

Ins. ii. p. 86. n. 9 (1762); Gronov., *Zoophyl.* p. 202. n. 821 (1764); Seba, *Thesaur.* iv. t. 53. f. 17 (1765); Harris, *Aurel.* t. 21. fig. c. d. (1766); Schaeff., *Elem. Ent.* t. 116. f. 2 (1766); id., *Icon.* t. 98. f. 1. 2 (1766); Goeze, *Beiträge Abh.* p. 95. n. 9 (1773); Ernst & Engr., *Ins. Eur.* iii. p. 13. t. 86. fig. d. e. t. 87. fig. i. k (1782); iid., *l.c.* p. 123. t. 122 (1782) (♂).

Sphinx convolvuli Linné, *Syst. Nat.* ed. x. p. 490. n. 6 (1758); Poda, *Mus. Graec.* p. 80. n. 3 (1761); Scop., *Ent. Carn.* p. 184. n. 468 (1763); Linné, *Mus. Lud. Ulr.* p. 345. n. 5. (1764); Hufn., *Berl. Mag.* ii. p. 176. n. 3 (1766); id., *l.c.* p. 192. Anm. 3 (1766); Houtt., *Natuurl. Hist.* i. 11. p. 412. n. 6 (1767); Linné, *Syst. Nat.* ed. xii. p. 798. n. 6 (1767); Müll., *Naturs.* v. 1. p. 637. n. 6 (1774); Meinecke, *Naturf.* i. p. 233 (1774); Harris, *Engl. Lep.* p. 30. n. 205 (1775); Fuessly, *Verz. Schweiz. Ins.* p. 32. n. 614 (1775); Fabr., *Syst. Ent.* p. 554. n. 27 (1775) (syn. pro parte); Den. & Schiff., *Syst. Verz. Schm. Wien* p. 41 (1776); Müll., *Zool. Dan.* p. 116. n. 1336 (1776); Kühn, *Beschäft. Berl. Naturf. Freunde* iii. p. 38 (1777) (v., viii.); Gladb., *Verz. Schm.* p. 29. t. 13. f. 1. 2 (1778); Fuessl, *Mag. Ent.* i. p. 262 (1778); Leske, *Anfangsgr. Nat.* p. 457. n. 3 (1779); Esper., *Eur. Schm.* ii. p. 52. t. 5 (*i., l.*) (1779) (syn. pro parte); Goeze, *Ent. Beytr.* iii. 2. p. 147. n. 6 (1780); Blumenb., *Handb. Nat.* p. 364. n. 3 (1780); Fabr., *Spec. Ins.* ii. p. 150. n. 46 (1781) (syn. partim); Fourcr., *Ent. Paris* ii. p. 254. n. 9 (1785); Fabr., *Mant. Ins.* ii. p. 97. n. 50 (1787) (syn. partim); Lang, *Verz. Schm. Augsb.* p. 66 (1789); Borkh., *Schm. Eur.* ii. p. 97. n. 3 (1789); Sepp., *Nederl. Ins.* iii. p. 165. t. 50. f. 5. 6 (178); Rossi, *Fauna Etrusca* ii. p. 162. n. 1055 (1790); Vieweg, *Tabell. Verz. Brandenb.* i. p. 9. n. 11 (1790); Gmel., *Syst. Nat.* i. 5. p. 2376. n. 6 (1790) (syn. partim); Brahm, *Insectenkalend.* ii. 1. p. 522. n. 382 (1791); Schwarz, *Raupenkal.* p. 351 (1791); Fabr., *Syst. Ent.* iii. 1. p. 374. n. 51 (1793) (syn. partim); Hübn., *Samml. Eur. Schm., Sphing.* t. 14. f. 70 (1795); Donov., *Brit. Ins.* vii. p. 31. t. 228 (1798); Prunn., *Lep. Ped.* p. 82. n. 168 (1798); Schrank, *Fauna Boica* II. i. p. 223. n. 1384 (1801); Walken., *Faune Paris., Ins.* ii. p. 279 (1802); Thunb., *Mus. Nat. Ups.* xxiii. p. 9. (1804); Turt., *Syst. of Nat.* iii. 2. p. 176 (1806); Shaw, *Gen. Zool.* vi. 1. t. 73 (1806); Ochs., *Schm. Eur.* ii. p. 236. n. 2 (1808); Nagel, *Hülfsb. Schmett.* p. 153 (1818); Sam., *Ent. Comp.* p. 244 (1819); Latr., in *Nouv. Dict. d'Hist. Nat.* xxxii. p. 24 (1819); God., *Lep. France* iii. p. 26. n. 4. t. 16 (1821); Vogel, *Schmett. Cabinet* ii. p. 17. t. 6. f. 2. a. b. c. (1822); Lep. & Serv., *Enc. Méth.* x. p. 465. t. 65. f. 1—3 (1825); Steph., *Illustr. Brit. Ent., Haust.* i. p. 119 (1828); Meig., *Handb. Schmett.* p. 98. n. 114 (1829); Boisd., *Ind. Meth.* p. 48. n. 394 (1829); Steph., *Cat. Brit. Ins.* ii. p. 31 (1829); Meig., *Syst. Beurb. Eur. Schm.* ii. p. 114. n. 15. t. 66. f. 2 (1830); Boisd., in *Voy. Astrol.* p. 184 (1832) (Taiti); id., *Faune Madag. Bourb.* p. 77 (1833) (Madag.; Bourb.; Maurice); Canten., in Silberm., *Revue Ent.* i. p. 77 (1833) (Dép. du Var, vi. ix.); Beske, *ibid.* ii. p. 177 (1834) (Hamburg); Friv., *ibid.* ii. p. 181 (1834) (Hungary); Lucas, *Lép. Eur.* p. 115. t. 47. f. 1 (1834); Thon, *Nat. Schm.* p. 106. t. 53. f. 735. t. 54. f. 736. 737 (1837); id. & Reich., *Ins. Krebse & Spinnen* p. 106. t. 53. f. 735. t. 54. f. 736. 737 (1838); Ramb., *Faune Andal.* p. 332 (1842) (Malaga); Westw. & Humphr., *Brit. Moths* p. 12. t. 3. f. 1. 2. 3. (1843); Eversm., *Fauna Volgo-Ural.* p. 112 (1844); Guér., in *Lefebvre, Voy. Abyss.* p. 386 (1845); Pierr., *Bull. Soc. Ent. France* p. 86 (1846) (Paris); Bell, *ibid.* p. 94 (1846) (Bretagne); Boisd., in *Delegorgue, Voy. Afr. Austr.* p. 595. n. 113 (1847) (Natal); Herr.-Sch., *Ear. Schm.* ii. 1. p. 90. n. 27 (1847); Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847); Lucas, *Expl. Algérie, Artic.* iii. p. 371. n. 68 (1849); Walk., *List Lep. Ins. B. M.* viii. p. 212. n. 1 (1855) (syn. partim.); Moore, in Horsf. & Moore, *Cat. Lep. Mus. E.I.C.* i. p. 267. n. 616. t. 9. f. 3. 3a (*l., p.*) (1857) (syn. partim.); Ménétr., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 90. n. 1489 (1857) (partim); Girard, *Bull. Soc. Ent. France* p. 220 (1859) (action de la Benzine sur les muscles); Brey., *Ann. Soc. Ent. Belg.* iv. p. 92 (1860); Orv., *Zoologist* xviii. p. 6818 (1860); Schw., *Verh. Nat. Ver. Anh.* xx. p. 24 (1861); Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.); Mann, *Wien. Ent. Mon.* vi. p. 66 (1862) (Brussa); Led., *ibid.* vii. p. 22 (1863) (Bulg., Rumel.); Wallengr., *Skand. Het. Fjär.* p. 29. n. 1 (1863); Ball., *Bull. Moscou* p. 364 (1864) (Gorki); Wallengr., *Kongl. Vet. Ak. Handl.* v. 4. p. 19 (1865) (Caffr. or.); Moore, *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal); Guen., in Vinson, *Voy. Madag.* p. 30 (1865); Koch, *Indo-Austr. Lep. Fauna* p. 54 (1865) (=*roseafasciata*); Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg); Snell., *Vlinders Nederld.* p. 98 (1867) (vi. vii. E. ix. x.); Hinterw., *Progr. Oberrealsch. Innsbr.* p. 229 (1868); Bien., *Lep. Erg. Reise Pers.* p. 32 (1869) (Astrabad, viii.); Tengst., *Act. Soc. F. F. Fenn.* x. p. 90 (1869); Backh., *Entom.* iv. p. 133 (1869); Good., *ibid.* p. 148 (1869); Gunn. *ibid.* p. 149 (1869); Hell., *Ent. Mo. Mag.* v. p. 160 (1869); id., *l.c.* p. 206 (1869); Hutch., *ibid.* p. 254 (1869); Hell., *l.c.* vii. p. 139 (1870); Knaggs, *ibid.* p. 160 (1870); Stef., *Bull. Soc. Ent. Ital.* ii. p. 280 (1870); Targ.-Tozz., *ibid.* p. 358 (1870) (odour); Heyl., *Tijdschr. Ent.* xiii. p. 146 n. 67 (1870) (Breda); Brutt., *Progr. Dorpat Gymn.* p. 23. n. 2 (1872); Buckl., *Ent. Mo. Mag.* ix. p. 286 (1873) (larva); Doubl., *Entom.* vi. p. 560 (1873) (larva); Siebke., *Ent. Ins. Norv.* iii. p. 23. n. 1 (1874); Boisd., *Spec. Gén. Lép. Hét.* i. p. 91. n. 31 (1875); Newm., *Entom.* viii.

p. 272 (1875) (larva) ; Katt., *Ent. Nachr.* ii. p. 12 (1876) ; Braun, *ibid.* p. 62 (1876) ; Bosw., *Scott. Nat.* iii. p. 265 (1876) (Orkney) ; Oberth., *Et. d'Ent.* i. p. 31 (1876) (Collo, vi. ix. x.) ; Snell., *Tijdsch. Ent.* xx. p. 3. n. 13 (1877) (Java) ; Pott., *Trans. Watf. N.H. Soc.* i. p. 108 (1878) ; Möll., *Ent. Nachr.* iv. p. 91 (1878) ; Bosw., *Scott. Nat.* iv. p. 199 (1878) ; Dew., *Mitth. Münch. Ent. Ver.* iii. p. 26 (1879) (Chinchoxo) ; Snell., *l.c.* xxii. p. 64. n. 5 (1879) (S. Celebes) ; Oberth., *Ann. Mus. Civ. Genova* xv. p. 172. n. 61 (1879) (Abyssinia) ; Weil., *Progr. Oberrealsch. Innsbr.* p. 15 (1880) (Tauferer Thal) ; Theden., *Ent. Tidskr.* i. p. 197 (1880) (Sweden) ; Kil., *Jahr. Nat. Ges. Graub.* xxiii. p. 43 (1880) ; Oberth., *Et. d'Ent.* v. p. 28. n. 69 (1880) (Askold, ix.) ; Plötz, *Stett. Ent. Zeit.* xl. p. 77. n. 286 (1880) (Afr. occ.) ; Sandahl, *Ent. Tidskr.* ii p. 213 (1881) ; Albr., *Bull. Moscou* p. 379 (1882) (Moscow) ; Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 261, t. 3. f. 16, t. 6. f. 52 (1882) (larva) ; Oberth., *l.c.* xviii. p. 733. n. 82 (1883) (Bogos) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxxiii. p. 287. n. 77 (1884) (Caffraria) ; Rom , *Mém. Lép.* i. p. 69 (1884) (Borjom ; Tiflis ; Derbent) : Pouj.. *Bull. Soc. Ent. France* p. 165 (1885) (éclosion) ; Lampa, *Ent. Tidskr.* vi. p. 26. n. 110 (1885) (Skand., Finld.) ; Demais., *Bull. Soc. Ent. France* p. 55 (1886) (Reims) ; Pagenst., *Iris* i. p. 86. n. (1886) (Aru) ; id., *Jahrb. Nass. Ver. Nat.* xxxix. p. 109. n. 1 (1886) (Aru) ; Amel., *Berl. Ent. Zeitschr.* xxxi. p. 261 (1887) (Dessau) ; Buckl., *Larvae Brit. Moths* ii. p. 22 108. t. 21. f. 2. t. 22. f. 1 (1887) ; Christ., in Rom., *Mém. Lép.* iii. p. 54 (1887) (Askhabad) ; Heulz, *Bull. Soc. Ent. France* p. 196 (1888) (Hérault, commou) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 103. n. 194 (1888) (Amboina) ; Alphér., in Rom., *Mém. Lép.* v. p. 83. n. 19 (1889) (Lob Nor) ; Mina-Pal. & Failla-Ted., *Nat. Sic.* vii. p. 41 (1889) ; Gr. Grschim., in Rom., *Mém. Lép.* iv. p. 510. n. 201 (1890) (Pamir) ; Meyrick, *Tr. N. Zeal. Inst.* xxii. p. 213 (1890) ; Baker, *Tr. Ent. Soc. Lond.* p. 204 (1891) (Madeira) ; Vins., *Pap. Bourbon* p. 13 (1891) ; Alphér., *l.c.* vi. p. 3. n. 68 (1892) (China) ; Staud., *ibid.* vi. p. 219. n. 207 (1892) (Amur, rare) ; White, *Butt. & Moths Teneriffe* p. 65 (1894) (= *batatae*) ; Reb. & Rog., in Baum., *Massailand* p. 338. n. 164 (1894) ; Kill & Caff., *Jahrb. Nat. Ges. Graub.* xxxviii. p. 19 (1895) ; Bonj., *Bull. Soc. Sc. Nat. Ouest France* vi. p. 29 (1896) (Nantes) ; Voss, *Tijdschr. Ent.* xli. p. 79 (1898) (Apeldoorn) ; Bartel, in Rühl, *Grossschm.* ii. p. 38 (1899) ; Braz., *Entom.* p. 15 (1899) (larva).

Herse convolvuli, Oken, *Lehrb. Naturg.* iii. 1. p. 762. n. 1 (1815).

Sphinx abadonna Fabricius, *Ent. Syst. Suppl.* p. 435 (1798) ; Auriv., *Ent. Tidskr.* xviii. p. 153. n. 83 (1897) (= *orientalis*).

Agrius convolvuli, Hübner, *Verz. bek. Schm.* p. 140. n. 1506 (1822).

Sphinx patatas Ménétriés, *l.c.* p. 90. n. 1491 (1857) (Taiti ; *nom. indescr. !*).

Sphinx roseofasciata Koch, *Indo-Austr. Lep. Fauna* p. 54 (1865).

Sphinx pseudo-convolvuli Schaufuss, *Nunq. Otios.* p. 15. (1870) (Natal).

**Sphinx convolvuli* var. *distans* Butler, *Voy. Erebus & Terror, Zool. Ins.* p. 30. t. 9. f. 11 (1874) (N. Zeal. ;—*Mus. Brit.*).

Protoparce convolvuli, id., *Trans. Zool. Soc. Lond.* ix. p. 609. n. 19 (1877) (England ; S. Afr.) ; Saalm., *Lep. Madag.* p. 132. n. 305 (1884) ; Druce, in *Moloney, West Afr. Forestry* p. 493. n. 14 (1887) ; Holl., *Tr. Amer. Ent. Soc.* xvi. p. 67. n. 27 (1889) (Afr. occ.) ; Misk., *Proc. Roy. Soc. Queensl.* vii. p. 3. n. 38 (1891) (Vict. ; N.S.W. ; Brisb. to Cardwell) ; Auriv., *Ent. Tidskr.* xiii. p. 183. n. 232 (1892) (Camer.) ; Dist., *Natural. Transvaal* p. 236 (1892) (Pretoria) ; Hamps., in Blauf., *Fauna Brit. Ind., Moths* i. p. 103. n. 162. f. 60 (1892) ; Semp., *Schmett. Philipp.* ii. p. 404. n. 51. t. H. f. 5. 6. 7 (*l., p.*) (1896) (Luzon ; Bohol ; Mindanao ; Cebu ; v.—x., xii.—iii.) ; Leech, *Tr. Ent. Soc. Lond.* p. 286. n. 62 (1898) (Japan ; China) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 416. n. 162 (1898) (Sikkim ; Bhutan ; up to 7000 ft., vi.—viii.) ; Nurse, *ibid.* xii. p. 513 (1899) (Cutch) ; Pagenst., in Chun., *Zoologica* xii. 29. p. 16. n. 16 (1900) (Ralum, viii. ii. ; Kinigunang) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 101. n. 735 (1901).

Protoparce distans Butler, *Trans. Zool. Soc. Lond.* ix. p. 609. n. 20 (1877) (N. Zeal. ; Austral.).

**Protoparce orientalis* id., *l.c.* n. 21. t. 91. f. 16. 17 (*l., p.*) (1877) (N. India ; Ceylon ; Burma ; China ; Japan ; Java ;—*Mus. Brit.*) ; id., *Proc. Zool. Soc. Lond.* p. 670. n. 35 (1880) (Formosa) ; Fors., *Tr. Ent. Soc. Lond.* p. 391 (1884) (life hist.) ; Butl. *l.c.* p. 494. n. 48 (1884) (Aden) ; Swinh., *ibid.* p. 289. n. 20 (1885) (Poona, vi. viii.—x. ; Bombay, ix. x. ; *l.* on *Colia*) ; Moore, *ibid.* p. 596 (1885) (Pt. Blair) ; Swinh., *l.c.* p. 435. n. 16 (1886) (Mhow, vi. vii. ix) ; Butl., *l.c.* p. 379. n. 97 (1886) (Campbellpore, viii.) ; Warr., *ibid.* p. 293. n. 2 (1888) (Campbellpore, vi. viii.) ; Leech, *ibid.* p. 588. n. 30 (1888) (Yokohama ; Fushiki ; Hakodate ; = *orientalis*) ; Swinh., *Journ. Bombay N. H. Soc.* iii. p. 119. n. 14 (1888) (Karachi, iii.—ix.) ; id., *Tr. Ent. Soc. Lond.* p. 165. n. 22 (1890) (Mandalay ; Rangoon ; Moulmein).

Protoparce pseudo-convolvuli, Butler, *Trans. Zool. Soc. Lond.* ix. p. 609 n. 22 (1877) (Natal).

Macrosila convolvuli, Butler, *Papilio* ii. p. 7 (1882) (specim. from N. Zeald. dist. spec.).

Sphinx convolvuli var. *batatae* Christ, *Mitth. Schw. Ent. Ges.* vi. p. 346 (1884); Alphér., in Rom. *Mém. Lép.* v. p. 223. n. 18 (1889) (Teneriffe); Bartel, in Rühl, *Grossschm.* ii. p. 43 (1898).

Protoparce convolvuli var. *distans*, Druce, *Proc. Zool. Soc. Lond.* p. 220 n. 5. (1888) (Fiji; N. Guinea; N. Hebrid.; N. Caled.; W. Austr.).

Phlegethontius convolvuli, Kirby, *Cat. Lep. Het.* i. p. 690. n. 36 (1892).

Phlegethontius pseudo-convolvuli, id., *l.c.* n. 37 (1892).

Phlegethontius resecofasciatus, id., *l.c.* n. 39 (1892) (=*distans*).

Phlegethontius orientalis, id., *l.c.* n. 38 (1892); Huwe, *Berl. Ent. Zeitschr.* xl. p. 367. n. 41 (1895) (Java).

Phlegethontius abadonna, Kirby, *l.c.* n. 40 (1893) (partim).

Sphinx convolvuli var. *orientalis*, Bartel, in Rühl, *Grossschm.* ii. p. 43 (1898).

Sphinx convolvuli, Pierret, *Bull. Soc. Ent. France* p. 54. (1842) (gynandr.); Alt., *Stett. Ent. Zeit* xxi. p. 91 (1860) (gynandr.); Pagenst., *Jahrb. Nass. Ver. Nat.* xxxv. p. 89 (1882) (gynandr.); Eckst., *Ber. Oberhess. Ges.* xxvi. p. 3. t. 2. f. 3 (1889) (gynandr.).

Sphinx convolvuli var. *alicea* Neuburger, *Zeitschr. Ent.* iv. p. 297 (1899).

Sphinx convolvuli var. *nigricans* Cannaviello, *Bull. Soc. Ent. Ital.* xxxii. p. 295 (1900).

♂ ♀. Pulvillus of claw-segment decidedly longer than in the other *Herse*, a distinct black flap being present. ♀ more uniform in colour than the ♂ on thorax and forewing. Metanotum with a red side-patch, which is more or less different in tint from the abdominal patches. The various names given to this widely distributed species are based upon slightly differing individuals from various countries. Although it is true that the Australian specimens are on an average rather small, and have, in the ♂, the disc of the hindwing just outside the cell between veins R^1 and R^3 rather more brown than the African and European individuals, a longer series of specimens shows that these distinctions in size and colour do not hold good. Such and similar differences referred to by many authors as being exhibited by individuals from this or that locality are not at all local.

The red metanotal and abdominal patches are very rarely replaced by yellow ones; such an aberrational individual is described from Nantes by Bonjour, *Bull. Soc. Sc. Nat. Ouest France* vi. p. 29 (1896).

Thorax: Pl. LXII. f. 7. 8; Pl. LXIII. f. 1.

♂. Tenth tergite rounded-dilated before end (Pl. XXVI. f. 15. 16), apex compressed, higher than broad, pointed; ventral process of harpe (Pl. XXXV. f. 4) somewhat spatulate as in *Coelonia fulvinotata*, the patch of setiferous tubercles of the clasper near the end of the harpe as in the allied species; but the tubercles resp. setae rather denser ventrally close to the harpe, and this portion of the clasper a little incrassate or even faintly produced ventrad, the slightly projecting part being the rudiment of the process found in *godarti*.

♀. The mesial flap (*a*) in front of the vaginal aperture arises from an impression, and is very thin; it belongs to the membrane connecting the seventh and eighth sternites; at each side of the vaginal orifice there stands a tubercle (*c*), and behind the orifice (I^7) another (*b*) (Pl. XXII. f. 4. 5).

Larva varying from green to black; head striped as in *Acherontia*; a dorso-lateral yellow streak from head to horn, and yellow oblique stripes on segments 4 to 11, generally accentuated at the upper end by a yellow dot. Horn with small tubercles. Food: *Convolvulus*, especially *arvensis*.

Pupa: tongue-sheath recurved frontad, tip nearly reaching base.

Hab. Eastern hemisphere except the higher latitudes, rarely in Siberia, straggler in northern countries.

In the Tring Museum several larvae, and over 350 imagines from a great number of localities, from Europe to the Solomons and Madagascar.

The Berlin Museum possesses a series of individuals of both sexes—we received

a pair in exchange from Jaluit, Marschall Islands, which differ markedly from all our *convolvuli*. The specimens are small and very pale, paler on body and forewing than the individuals from other localities, at least in the ♂ sex, and have a yellowish grey tint, which is very distinct in the ♂. We think it advisable to await further evidence of the constancy of the characters which distinguish the Jaluit specimens before naming the form.

11. MEGACORMA gen. nov.—Typus: *obliqua*.

Macrosila Walker, *List. Lep. Het. B. M.* viii. p. 198 (1856) (partim).
Sphinx, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 69 (1875) (partim).
Diludia, Butler (*non* Grote & Robins., 1865), *Tr. Zool. Soc. Lond.* p. 612 (1877) (partim).
Meganoton, Kirby (*non* Boisduval, 1875), *Cat. Lep. Het.* i. p. 682 (1892) (partim).
Pseudosphinx, Hampson (*non* Burmeister, 1856) in Blanf., *Fauna Brit. Ind., Moths* i. p. 104 (1892) (partim).

♂ ♀. Tongue much longer than the body. Second segment of palpus narrower at base, triangular, very much shorter than first segment; apex of the latter with a regular and large cavity; on the inner surface the first segment flat, not obviously concave as in *Herse*, scaling at apical margin very regular (Pl. LX. f. 2), this scaling visible from the outer side (Pl. LX. f. 3); inner surface of second segment all scaled, cavity less deep than in *Herse* and *Acherontia*, the roof of scales over the cavity not quite so distinctly separate from the other scaling of the segment than in the allied genera. Antennae thickest not far from base, gradually thinning towards end. Thorax very long, extending far beyond the base of the forewing. Tarsi long, slender, spines short; middle and hinder tarsi with conspicuous comb of prolonged spines; hinder tibia as long as first tarsal segment; pulvillus present, paronychium with two lobes on each side.

♂. Tenth abdominal sternite with a broad rounded mesial lobe, convex below. Harpe armed with long teeth. Clasper with a large patch of very broad, multidentate scales, and eighth tergite with elongate, tawny, friction-scales at the apex: these scales turned inside, but not forming a ribbon as in *Ambulicinae*. Anterior coxae with scent-organ; the tufts of hairs generally visible without removal of the coxae.

♀. Eighth tergite shallowly and broadly sinuate, the angles strongly rounded. Vaginal plate membranaceous proximally, much folded; anterior margin of the vaginal orifice produced into a truncate, feebly sinuate, lip, the angles prominent; post-vaginal part of plate more strongly chitinised, smooth, short (Pl. XXII. f. 3).

Early stages not known.

The peculiar structure of the palpi has been overlooked; the conspicuous cavity formed by the scaling at the end of the first segment of the palpi is similar to that found in *Theretra* and allies.

Hab. Oriental Region.

One species.

6. Megacorma obliqua.

**Macrosila obliqua* Walker, *l.c.* p. 208. n. 15 (1856) (Ceylon;—Mus. Brit.).
**Sphinx nestor* Boisduval, *l.c.* p. 113. n. 54 (1875) (Himalaya, ♀;—coll. Charles Oberthür).
Diludia obliqua, Butler, *l.c.* p. 614. n. 10 (1877) (Ceylon); Moore, *Lep. Ceylon* ii. p. 4. t. 74. f. 2. (1882).
Meganoton obliqua, Kirby, *l.c.* n. 2 (1892) (Ceylon).

Meganoton nestor, id., *l.c.* n. 3 (1892) (Himalaya); Huwe, *Berl. Ent. Zeitschr.* xl. p. 367. n. 40 (1895) (Java).

Pseudosphinx discistriga, Hampson (*non* Walker, 1856), *l.c.* p. 105. n. 169 (1892) (partim); id., *Illustr. Typ. Spec. Lep. Het. B.M.* ix. p. 3. n. 52 (1893) (partim); Pagenst., in Chun, *Zoologica* xii. 1. p. 17. n. 17 (1900) (partim; Ralum, N. Britain = N. Pommern).

♂ ♀. Tenth abdominal tergite (Pl. XXVI. f. 19) resembling in a dorsal view that of *Herse convolvuli*, slenderer in a lateral view, gradually narrowed to a point. Clasper sole-shaped, rounded-dilated dorsally before end, ventral margin oblique; harpe (Pl. XXXV. f. 8) with a broadly sickle-shaped distal process, which points dorsad, and is armed at the rounded ventro-distal edge with long suberect teeth, the most proximal tooth broad; spines of clasper near harpe longer than in the species of *Herse*. Penis-sheath unarmed externally, as broad as in *Herse*. Vaginal plate see above.

The specimen recorded by Pagenstecher from Ralum (*Dahl*, 3. i. '97) is in the Berlin Museum, where we have examined it. It is *obliqua*. Pagenstecher himself says, *l.c.*, that the individuals recorded by him as *discistriga* correspond to the *obliqua* and *discistriga* forms. Following Hampson, unfortunately too closely, he gives as synonyms of *discistriga*—which should stand as *menephron*—three distinct species; the four species thus treated as one belong, in fact, to three genera.

There is no species with which *obliqua* could be confounded, if one compares the palpi, or the size of the thorax, or the pattern of the body and wings.

The insect is apparently rare, but has a wide range.

Hab. Ceylon, N. India to the Bismarck Archipelago, probably in all the Indo-Malayan and the Papuan countries, but so far found only—to our knowledge—in Ceylon, Burmah, Sumatra, Java, Neu Pommern (N. Britain).

In the Tring Museum 3 ♂♂, 1 ♀ from: Ceylon; Bassein; Burma; Benkoelen, W. Sumatra (Eriesson).

III. ACHERONTIA.—Typus: *atropos*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1858) (partim); type: *ocellata*).

Acherontia Laspeyres, *Jenaische Allg. Lit. Zeit.* iv. p. 99 (1809) (type: *atropos*); Ochs., *Schm. Eur.* iv. p. 44 (1816).

Atropos Oken, *Lehrb. Naturg.* iii. p. 762 (1815) (type: *atropos*).

Brachyglossa Boisduval, *Ind. Meth.* p. 33 (1829) (nom. maxime supervac.; *Acherontia* cit. sub synon. !!).

Manduca Hübner, *Tentam.* p. 1 (1806) (*nom. indescr.!*); Kirby, *Cat. Lep. Het.* i. p. 700 (1892).

As *Manduca* of Hübner is a name without definition, it is not a scientific term, and cannot supersede *Acherontia*. Hübner himself employed the name later on not for a genus, but for a whole "stirps."

♂ ♀. Tongue short, very thick, hairy, opening before end large, dorsal. Palpi not touching each other, second segment a little shorter than the first; carina of clypeus and base of tongue visible. Antenna thick, much shorter than the forewing is broad at its widest point. Body very stout. Legs short and stout; anterior tibia short, a little longer than the cell of the hindwing is broad; spur reaching end of tibia; lateral spines of anterior tarsus heavy; middle and hinder tarsi strongly compressed, spines heavy; two ventral rows, besides an interno-lateral row of shorter ones, and a number of dorsal and subdorsal spines representing the

fourth row ; these latter spines fewer in number and gradually more ventro-lateral on the distal segments : no comb of prolonged spines ; posterior tarsus as long as the cell of the hindwing. Pulvillus absent, paronychium reduced to a short broad lobe. Scaling of body and legs (inclusive of spurs of mid- and hindtibia) woolly : scales of the upper layer of the forewing multidentate, the teeth long and thin, especially on the under surface, the scales of the hindwing longer, narrower, partly hair-like, the broader ones deeply slit or long-toothed.

♂. Tenth abdominal tergite long, slender, pointed (Pl. XXVI. f. 20. 21), the same in the three species of the genus ; harpe with two processes or teeth (Pl. XXXV. f. 1. 2. 3) ; clasper sole-shaped, with a patch of large multidentate friction-scales. Penis-sheath long and thin, without armature.

♀. Aperture of vagina with an elliptical rim ; eighth tergite shallowly sinuate.

Larva with tuberculated horn, which is horizontal with the end recurved, about ⌐-shaped.

Pupa without free tongue case.

Hab. Old World, except the Papuan subregion, occurring as far east as Ceram and the islands north of Timor.

Three species.

Much has been written about the sound produced by the imago. The origin of this sound has often been erroneously attributed to friction. There can be no doubt whatever that the real cause of the squeak is the forcing of air through the trunk, though it has not been ascertained with certainty whether this air comes from cavities in the head or from some other source, for instance the sucking bladder. The imago produces this sound occasionally when still enveloped by the skin of the chrysalis. The larva makes another kind of sound, most likely with the mandibles.

Key to the species :

a. Hindwing above with a large black patch in basal half . . . . . 7. *A. lachesis*.
Hindwing above with the basal half yellow . . . *b*.
b. Abdomen beneath with black segmental bands . 8. *A. atropos*.
Abdomen beneath without black segmental bands, only with small black mesial spots . . . 9. *A. styx*.

7. Acherontia lachesis.

Sphinx atropos, Stoll (*non* Linné, 1758), in Cramer, *Pap. Ex.* iii. p. 74. t. 237. f. A. (1779) (Java) ; Gray, in Griffith, *Anim. Kingd.* xv. t. 137. f. 4 (1832).

Sphinx lachesis Fabricius, *Ent. Syst. Suppl.* p. 434. n. 26-7 (1798) (Ind. or. ;—Mus. Copenhagen) ; Auriv., *Ent. Tidskr.* xviii. p. 152. n. 79 (1897) (= *lachesis* of Moore, etc.).

Acherontia morta Hübner, *Verz. bek. Schm.* p. 140. n. 1496 (1822) ; Butl., *Tr. Zool. Soc. Lond.* ix. p. 598. t. 92. f. 9 (*l.*) (1877) (Java, Hongkong, Assam, Ceylon) ; Moore, *Proc. Zool. Soc. Lond.* p. 595 (1879) (Pt. Blair ; = satanas = lethe = ? lachesis) ; Butler, *Proc. Zool. Soc. Lond.* p. 613 (1881) (Kurachi, vii. viii., common) ; Swinh., *ibid.* p. 290. n. 24 (1885) (Poonah, vi. viii. ; Bombay, viii. ix. ; sound of *l.*, variat. of *l.* acc. to food) ; id., *l.c.* p. 435. n. 15 (1886) Mhow, ii. ix.) ; Leech, *Tr. Ent. Soc. Lond.* p. 119. n. 90 (1889) (Kinkiang) ; Swinh., *Tr. Ent. Soc. Lond.* p. 164. n. 21 (1890) (Moulmein) ; Hamps., *Illustr. Typ. specim. Lep. Het. B.M.* viii. p. 2. n. 29 (1891) (Nilgiris, 6,000 ft.) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 30. n. 122 (1892).

(?) *Spectrum charon* Billberg, *Enum. Ins.* p. 83 (1822) (*nom nud.* ; Java).

**Acherontia satanas* Boisduval, *Spec. Gén. Lép.* i. t. 16. f. 1 (1836) (coll. Charles Oberthür) ; Blanch., in Jacquem., *Voy. Ind.* iv. p. 23. n. 19 (1844) ; Moore, in Horsf. & Moore, *Cat. Lep.*

Mus. E.I.C. i. p. 267. n. 615. t. 9. f. 2. 2*a* (*l., p.*) (1857) ; Ménétr., *Enum. Corp. Anim. Mus. Petr. Lep.* p. 93. n. 1554 (1857) (Ind. or.) ; Walk., *Journ. Linn. Soc. Lond.* vi. p. 85. n. 14 (1862) (Sarawak); Feld., *Wien. Ent. Monat.* v. p. 30. n. 33 (1862) (Ning-po) ; Moore, *Proc. Zool. Soc. Lond.* p. 793 (1865) (Balasore) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 7. n. 3 (1875) ; Snell., *Tijdschr. Ent.* xx. p. 4. n. 15 (1877) (Java) ; id., *l.c.* p. 67 (1877) (Sumatra) ; id., *l.c.* xxii. p. 63. n. 2 (1879) (S. Celebes) ; id., in Snellemann, *Fauna Midd. Sumatra* ii. p. 29 (1892).

**Acherontia lethe* Westwood, *Cab. Or. Ent.* p. 87. t. 42. f. 2 (1848) (Mus. Oxford) ; Walk., *Cat. Lep. Het. B.M.* viii. p. 235. n. 2 (1856) (Assam ; Ceylon) ; Wall., *Proc. Ent. Soc. Lond.* p. 10 (1864) (alive in England.).

Acherontia circe Moore, in Horsf. & Moore, *Cat. Lep. Mus. E.I.C.* i. p. 267. n. 615 (1858) (sub syn. ; nom. maximo supervac.).

Acherontia lachesis, id., *Lep. Ceylon* ii. p. 6. t. 77. f. 1. 1*b*. 1*c*. (*l., p., i.*) (1882) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 103. n. 191 (1888) (Amboina) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 67. n. 89 (1892) ; Semp., *Schm. Philipp.* ii. p. 390. n. 20. t. 9. f. 1. 2. 3 (*l., p.*) (1896) ; Piep., *Tijdschr. Ent.* xl. p. 104 (1897) (Java) ; Leech, *Tr. Ent. Soc. Lond.* p. 275. n. 33 (1898) (China, vi. vii. viii.) ; Dudg., *Journ. Bombay N.H. Soc.* xi. p. 406. n. 89 (1898) ; Bartel, in Rühl, *Grossschm.* ii. p. 25 (1899).

Acherontia styx, Swinhoe, *Proc. Zool. Soc. Lond.* p. 513. n. 1 (1884) (Karachi, vii. viii., larva different on diff. plants).

Manduca lachesis, Kirby, *Cat. Lep. Het.* i. p. 700 n. 5 (1891) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 368. n. 42 (1895) (Java).

Manduca lachesis ab. *atra* Huwe, *lc.* (Java. ♀).

♂ ♀. The amount of black is very variable both on abdomen and wings ; the black colour generally more extended on the abdomen of the ♂ than on that of the ♀. The stigma of the forewing is small and white ; it is contiguous with a black patch situated in the apex of the cell ; the line at the proximal side of the same patch forms a kind of ring before the inner margin, being joined behind SM^2 to a discal line.

Palpi widely separate at end. Spines on the outer side of the first segment of the foretarsus numerous. Metanotum and end of mesonotum marked with red hairs ; edge of skull-mark also generally with some red hairs. The white scaling at the end of the antenna a little more extended than in *atropos* ; antenna longer than in *atropos*, in ♂ as stout as, but in ♀ obviously thinner than, in that species.

♂. Armature of harpe (Pl. XXXV. f. 2) represented by two parallel hooks, sinus between them rounded (in dorsal view).

♀. Vaginal aperture provided proximally with a transverse ridge or flap, which is rounded laterally and shallowly sinuate mesially.

Larva : a yellow form with oblique red bands, and a green form with oblique yellow bands bordered with blue in front.—Food-plants : *Antidesma*, *Datura*, *Nicotiana tabacum*, etc.

Hab. From China, N. and S. India, Ceylon, eastwards to the Southern Moluccas (Ceram, Amboina). Not yet found in N.W. India and Japan.

In the Tring Museum 70-odd specimens from : Ceylon, S. India (Nilgiris) Sikkim, Assam, China (one of them labelled "Pekin"), Malay Pen., Sumatra, Nias, Borneo, Palawan, Java, Lombok, Timor, Celebes, Ceram.

8. Acherontia atropos.

Aldrov., *De Anim. Ins.* p. 363. f. 3 (1602) ; id., *l.c.* ed. Franc. p. 96 (1618) ; Moufet, *Theatr. Ins.* p. 89. fig. (1634) ; Schroeck, *Ephem. Ac. Nat. Cur.* Dec. 2. Ann. 7. Obs. 254. p. 475 (1688) ; Albin. *Engl. Ins.* t. 6 (1720) ; Réaum., *Hist. Ins.* i. p. 293. t. 14. f. 2 ; id., *l.c.* ii. p. 289. t. 24. f. 4. 5 (1736) ; Wilke, *Engl. Moths Ch. I.S.B.* p. 9. t. 1 (1747) ; Roesel, *Ins. Belust.* iii. p. 15. frontisp (?). t. 1. f. 1–4 (*l., p.*). t. 2. f. 5. 6 (*i.*) (1755) ; Hemm., *Coll. Cur. Ins.* t. 1. f. a. b. c. (*l., i.*) (17?- ?) ; Linné, *Iter Hasselquist* pp. 408. 417. n. 104 (1757) ; Jonst., *Theatr. Anim.*

iii. t. 7. f 1 (i.) (1757) ; Sulz., *Kennz. Ins.* p. 121. t. 15. f. 88 (1761) ; Roes., *l.c.* iv. p. 234 (1761) ; Geoffr., *Hist. Ins.* ii. p. 85. n. 8. (1762) ; Harris, *Aurelian* t. 37 (1766) ; Schaeff., *Icon. Ratisb.* t. 99. f. 1. 2 (1766) ; Degeer, *Hist. Ins.* ii. 1. p. 242 (1771) ; Kühn, *Anleitung* p. 71 (1773) ; Martini, *Allg. Gesch. Nat.* i. p. 89 (1774), iii. p. 493. t. 113. f. 1. 2 (l.). 3 (p.). 4 (excrem.). 5. 6 (i.) (1777) ; Ernst. & Engr., *Ins. Eur.* iii. p. 80. t. 105. fig. d—f. t. 106 fig. g—k (1782).

Sphinx atropos Linné, *Syst. Nat.* ed. x. p. 490. n. 8 (1758) ; Scop., *Ent. Carn.* p. 184. n. 469 (1763) (sound of imago and larva) ; Linné, *Mus. Lud. Ulr.* p. 348 (1764) ; Houtt., *Naturl. Hist.* i. 11. p. 424. n. 8. t. 84. f. 3 (l.) (1767) ; Linné, *Syst. Nat.* ed. xii. p. 799. n. 9 (1767) ; Müll., *Naturs.* v. 1. p. 638. n. 9. t. 14. f. 3 (l.) (1774) ; Goeze, *Bonnet's Abhandl.* p. 94. n. 2. (1774) ; Fuessly, *Verz. Schweiz. Ins.* p. 32. n. 616 (1775) ; Fabr., *Syst. Ent.* p. 539. n. 1 (1775) ; Harris, *Engl. Lep.* p. 30 n. 206 (1775) ; Cram., *Pap. Exot.* i. p. 123. t. 78. f. A (1775) ; Deu. & Schiff., *Verz. Schm. Wien* p. 41 (1776) ; Kühn, *Naturforsch.* ix. p. 93 (1776) ; Esper, *Schmett.* i. p. 27 (1777) ; id., *l.c.* ii. p. 69. t. 7 (1779) ; Leske, *Anfangsgr. Naturg.* i. p. 457. n. 4 (1779) ; Blumenb., *Handb. Naturg.* p. 365. n. 5 (1779) ; Mein., *Naturforsch.* xiii. p. 176 (1780) ; Goeze, *Ent. Beytr.* iii. 2 p. 155. n. 9 (1780) ; Hübn. & Fuessly, in *Fuessly, Arch. Insectyesch.* ii. tab. (1781) (sound of larva) ; Fabr., *Spec. Ins.* ii. p. 144. n. 23 (1781) ; Barbut, *Gen. Ins. Linn.* p. 178 (1781) ; Fourcr., *Ent. Paris.* ii. p. 253. n. 8 (1785) ; Fabr., *Mant. Ins.* ii. p. 95. n. 26 (1787) ; Borkh., *Schm. Eur.* ii. p. 88. n. 1 (1788) ; Sepp, *Nederl. Ins.* iii. p. 97. t. 27. f. 4. t. 28. f. 5. 6 (178–) ; Gmel., *Syst. Nat.* i. 5. p. 2378. n. 9 (1790) (p. parte) ; Fabr., *Ent. Syst.* iii. 1. p. 364. n. 27 (1793) ; Prunner, *Lep. Ped.* p. 84. n. 171 (1798) ; Donov., *Brit. Ins.* ix. p. 3. t. 289 (1800) ; Schrank, *Fauna Boica* ii. 1. p. 224. n. 1387 (1801) ; Walck., *Faune Paris. Ins.* ii. 278 (1802) ; Thunb., *Mus. Nat. Ups.* xxiii. p. 9 (1804) ; Shaw, *Gen. Zool.* vi. 1. t. 74 (1806) ; Turt., *Syst. Nat.* iii. 2. p. 172 (1806) ; Ochsenh., *Schm. Eur.* ii. p. 231. n. 1 (1808) ; Hübn., *Eur. Schm., Sphing.* i. t. 13. f. 68 (1805—) ; Nagel, *Hülfb. Schmettsamml.* p. 150 (1818) ; Sam., *Ent. Comp.* p. 244 (1819) ; Latr., in *Nouv. Dict. Hist. Nat.* xxi. t. 24. f. 4., xxxii. p. 23 (1819) (cri) ; Wood, *Ill. Linn. Gen. Ins.* ii. p. 7 tab. (1821) ; Godart, *Lep. France* iii. p. 16. t. 14 (1821) ; Lep. & Serv., *Enc. Méth.* x. p. 465. t. 63. f. 9–12 (1825) ; Latr., in *Cuvier, Règne Anim., Ins.* t. 146. f. 2 (1833) ; Beske, in Silberm., *Revue d'Ent.* ii. p. 177 (1834) (Hamburg) ; Bory, *ibid.* ii. p. 179 (1834) (Canaries) ; Frivald., *ibid.* ii. p. 181 (1834) (Hungary) ; Luc., *Lép. Eur.* p. 116. t. 48 (1834) ; Eversm., *Fauna Volgo-Ural.* p. 113 (1844).

Acherontia atropos, Laspeyres, *Jenaische Allg. Lit.-Zeit.* iv. p. 99 (1809) ; Ochsenh., *Schm. Eur.* iv. p. 44 (1816) ; Hübn., *Verz. bek. Schm.* p. 139. n. 1494 (1822) ; Steph., *Ill. Brit. Ent., Haust.* i. p. 114 (1828) ; id., *Cat. Brit. Ins.* ii. p. 31 (1829) ; Thon, *Nat. Schm.* p. 108. t. 53. f. 744–6 (1837) ; Duponch., *Bull. Soc. Ent. Fr.* p. 54 (1838) (cri) ; Nordm., *ibid.* p. 55 (1838) (cri) ; Duponch., *Ann. Soc. Ent. Fr.* p. 59 (1839) (cri) ; Goureau, *ibid.* p. 125 (1840) (cri) ; Blanch., *Hist. Nat. Ins.* iii. p. 480 (1840) ; Ramb., *Faune Andal.* p. 331 (1842) ; Westw. & Humphr., *Brit. Moths* p. 9. t. 2. f. 1. 2. 3 (*l., p., i.*) (1843) ; Abic., *Bull. Soc. Ent. Fr.* p. 50 (1843) (cri) ; Ghil., *ibid.* p. 72 (1844) (cri) ; Paris, *ibid.* p. 95 (1846) (cri) ; Bell., *ibid.* p. 110 (1846) (cri) ; Lab. & Guen., *ibid.* (1846) (var. of *l.*) ; Bell., *ibid.* p. 111 (1846) (var. of *l.*) ; Paris, *ibid.* p. 112 (1846) (cri) ; Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847) ; Boisd., in *Deley., Voy. Afr. Austr.* p. 595 (1847) (Natal) ; Herr.-Sch., *Eur. Schm.* ii. 1. p. 90. n. 28 (1847) ; Lucas, *Expl. Algérie, Art.* iii. p. 371. n. 69 (1849) ; Blanch., in Orb., *Dict. Hist. Nat.* xi. p. 756. *Atlas Lép.* t. 17 f. 1 (1849) ; Noye, *Trans. Nat. Hist. Antiq. Penzance* i. p. 122 (1851) ; Becker, *Bull. Soc. Ent. France* p. 8 (1854) (l. on tobacco) ; Walk., *Lep. Het. B.M.* viii. p. 233. n. 1 (1856) ; Hoeven, *Tijdsch. Ent.* ii. p. 11 (1859) (sound prod. by stridul. ; literature) ; Mann, *Wien. Ent. Mon.* iii p. 92 (1859) (Sicilia) ; Verl., *Tijdschr. Ent.* iii. p. 24 (1860) (sound of larva) ; Westw., *ibid.* p. 120 (1860) (sound not stridul.) ; Maitl., *ibid.* v. p. 20 (1862) (sound) ; Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.) ; Hopffer, in Peters, *Reise Mozamb.* p. 424 (1862) ; Wallengr., *Skand. Het. Fjär.* p. 20. n. 1 (1863) ; Ball., *Bull. Moscou* p. 363 (1864) (Gorki) ; Guen., in Vinson, *Voy. Madag.* p. 30 (1865) ; Girard, *Bull. Soc. Ent. France* p. 49 (1865) (var. of l.) ; Newm., *Entom.* ii. p. 280 (1865) (life hist.) ; Johns., *ibid.* p. 325 (1865) (noise) ; Merr., *ibid.* p. 325 (1865) (breeding) ; Wallengr., *Kongl. Sv. Ac. Handl.* v. 4. p. 19 (1865) (Caffr. or.) ; White, *Proc. Roy. Phys. Soc. Edinb.* iii. p. 345 (1866) (Shetland) ; Capronn., *C. R. Soc. Ent. Belg.* x. p. 16 (1866) ; Light., *Ent. Mo. Mag.* ii. p. 116 (1866) (*larva* on *Symphoricarpus*) ; Mauriss., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Gavere, *ibid.* x. p. 197. n. 67 (1867) (Groningen) ; Bonn., *Entom.* iii. p. 42 (1867) (breeding) ; Smith, *Proc. Roy. Phys. Soc. Edinb.* iii. p. 353 (1867) ; Snell., *Vlind. Nederl.* p. 100 (1867) (vi., viii., ix.) ; Voll., *Tijdschr. Ent.* xi. p. 12 (1868) ; Hinterw., *Progr. Realsch. Innsbr.* p. 228 (1868) ; Bury, *Zoologist* (2). iv. p. 1913 (1869) (*atropos* and bees) ; Tengstr., *Ac. Soc. F. F. Fennica* x. p. 6. n. 90 (1869) ; Bien., *Lep. Ergebn. Reise Persien* p. 32 (1869) (Astrabad) ; Sidcb., *Proc. Lit. Philos. Soc. Manch.* ix.

p. 62 (1870) ; Staint., *Proc. Ent. Soc. Lond.* p. 14 (1870) ; Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 66 (1870) (Breda) ; Thorpe, *Entom.* v. p. 143 (1871) (breeding) ; Lock., *ibid.* p. 458 (1871) ; Brutt., *Progr. Gymn. Dorpat* p. 23. n. 1 (1872) ; Moseley, *Nature* vi. p. 151. fig. (1872) (sound) ; Christ., *Stett. Ent. Zeit.* xxxiii. p. 216 (1892) (Derbent, l. on *Zygophyllum*) ; Corb., *Entom.* vi. p. 520 (1872) (hibern.) ; Girard, *l.c.* p. 192, 221 (1873) (cri) ; Christ., *Hor. Soc. Ent. Ross.* x. p. 31 (1873) (Gjas) ; Laboulb., *Ann. Soc. Ent. Fr.* p. 537 (1873) (cri) ; Siebke, *En. Ins. Norv.* iii. p. 22. n. 1 (1874) ; Weyenb., *Tijdschr. Ent.* xvii. p. 168 (1874) (sound, l. & p.) ; Land., *Jahrb. Westph. Proc. Ver. Wiss. Kunst* p. 55 (1874) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 5. n. 1 (1875) (Africa ; Asia *ex err.*) ; Roeb., *Pet. Nouv. Ent.* i. p. 472 (1875) (cri) ; Oberth., *Et. d'Ent.* i. p. 31 (1876) (Oran ; Collo) ; Gasch., *Ann. Soc. Ent. France* p. 509 (1876) (migrat.) ; Swint., *Ent. Mo. Mag.* xiii. p. 217 (1877) (sound) ; Butl., *Tr. Zool. Soc. Lond.* ix. p. 598. n. 3 (1877) ; Schoy., *Nyt. Mag. Naturv.* xxiv. p. 150 (1879) ; Dew., *Mitth. Münch. Ent. Ver.* iii. p. 26 (1879) (Cbinchoxo) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 43 (1880) ; Marsh., *Scott. Nat.* v. p. 36 (1880) ; Weiler, *Progr. Oberrealsch. Innsbr.* p. 15 (1880) ; Arnb., *Sitz.-Ber. Zool. Bot. Ges. Wien.* xxix. p. 54. fig. (1880) ; Theden., *Ent. Tidskr.* i. p. 197 (1880) (Suecia) ; id., *l.c.* ii. p. 105 (1881) ; Westw., in Oates, *Matabeleld.* p. 355 (1881) ; Const., *Bull. Soc. Ent. France* p. 76 (1882) (Cannes) ; Auriv., *Kongl. Sv. Vet. Ac. Handl.* xix. 5. p. 131. n. 166 (1882) ; Albr., *Bull. Moscou* p. 379 (1882) (Moskau) ; Romanoff, *Mém. Lép.* i. p. 69 (1884) (Tiflis ; Borjom ; Lagodekhi ; Lenkoran ; Daghestan ; Helenendorf) ; Saalm., *Lep. Madag.* p. 129. n. 300 (1884) ; Lampa, *Ent. Tidskr.* v. p. 26. n. 109 (1884) ; Sandb., *ibid.* vi. p. 194. n. 4. (1885) (Sydvaranger) ; Poujade, *Bull. Soc. Ent. France* p. 165 (1885) (éclosion) ; Oberth., *ibid.* p. 215 (1885) (Bretagne, abundant) ; Fallou, *ibid.* p. 226 (1885) (localit. in France) ; Seriz., *Bull. Acad. d'Hippone* xx. (Sep.). p. 9. n. 57 (1887) (Collo) ; Druce, in Moloney, *West Afr. Forestry* p. 493. n. 12 (1887) (Gambia) ; Amel., *Berl. Ent. Zeitschr.* xxxi. p, 261 (1887) (Dessau) ; Denfer, *Bull. Soc. Ent. France* p. 200 (1889) (cri, pupa) ; Mab., *ibid.* p. 234 (1889) (Afr. ; Asie *ex err.*) ; Holl., *Tr. Am. Ent. Soc.* xvi. p. 67. n. 25 (1889) (Gaboon) ; Mina-Pal. & Faitla-Ted., *Nat. Sic.* vii. p. 41 (1889) ; Redlich, *Ent. Zeit. Guben* iii. p. 130 (1890) (sound) ; Cuisine, *Bull. Soc. Ent. France* p. 104 (1890) (aberrat.) ; Boise, *ibid.* p. 35 (1890) (cri de la pupa avant éclos.) ; Baker, *Tr. Ent. Soc. Lond.* p. 201 (1891) (Madeira) ; Vinson, *Papill. Bourbon* p. 13 (1891) ; Dist., *Natural. Transvaal* p. 236 (1892) (Pretoria, III.) ; White, *Butt. Moths Teneriffe* p. 64. t. 4. f. 1 (1894) ; Barrett, *Lep. Brit. Isl.* ii. p. 16 (1895) ; Holl., in Smith, *Unkn. Countr. Afr.* p. 412 (1897) (Somalild.) ; Aign., *Illustr. Zeitschr. Ent.* iii. p. 337 (1898) ; id., *l.c.* iv. p. 3. 177. 211. 289. 377. 355. cuts (1899) (sound prod. by stridul.) ; Vos, *Tijdschr. Ent.* xli. p. 79 (1898) (Apeldoorn) ; Bartel, in Rühl, *Grossschm.* ii. p. 17 (1899) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 98. n. 717 (1901) (p. parte).

Atropos solani Oken, *Lehrb. Naturg.* iii. 1. p. 762. n. 1 (1815) (=*atropos*).

Spectrum atropos, Billberg, *Enum. Ins.* p. 83 (1822) (Suecia).

**Acherontia sculda* Kirby, *Trans. Ent. Soc. Lond.* p. 242 (1877) ("Borneo" *err. loc.* ;—Mus. Dublin) ; Waterh., *Aid Identif. Ins.* ii. t. 141. f. 2 (1884).

Sphynx atropos, Vogel, *Schm. Cabinet* i. p. 22. t. 6. f. 4. a. b. (1821).

Brachyglossa atropos, Boisduval, *Ind. Meth.* p. 33 (1829) (v. ix.) ; id., *Faune Madag. & Bourb* p. 77 (1833) (Mad. ; Bourbon ; Maurice) ; Cant., in Silberm., *Revue Ent.* i. p. 77 (1833) (Dép. du Var, iv., ix.).

Sphinx atropus (!), Swains. & Shuck., *Hist. & Arr. Ins.* p. 101 (1840).

Sphynx (*Acherontia*) *atropos*, Heulz, *Bull. Soc. Ent. France* p. 7 (1887) (l. on Fraxinus).

Acherontia atropos, Taschenberg, *Zeitschr. Ges. Naturw.* xxii. p. 520 (1863) (gynandrom.).

Manduca sculda Kirby, *Cat. Lep. Het.* i. p. 700. n. 3 (1892) ("Borneo" *ex err.*).

Manduca atropos, id., *l.c.* n. 4 (1892).

♂♀. A decidedly Aethiopian insect, which extends far into the Palearctic Region, being in the more northern districts, however, a visitor only, which does not survive the winter as a rule. It does not occur in the eastern countries of the Palearctic Region (Japan, Amurland), nor in the Oriental Region, the eastern insect, which many authors have confounded with *atropos* and recorded as such, being in colour and structure quite distinct. In Siberia proper no representative of *Acherontia* is found.

The specimen of *Acherontia* described by Kirby as *sculda*, with the erroneous habitat "Borneo," is nothing else but an individual of *atropos*.

A. atropos is a white crow among the large Lepidoptera occurring in Europe :

it is a species without named *abs.* and *vars.*, though its individual variability is not inconsiderable. The frightening skull-mark, the symbol of death, apparently suppressed all earthly vanity in those who were or are the possessors of aberrant specimens.

The forewing is occasionally nearly all black, with the lines obscure and the white or ochraceous scaling in the subapical region obliterate : on the other hand there occur individuals with an unusually large ochraceous subapical patch. The discal band of the hindwing is sometimes absent, or vestigial ; the outer band is also occasionally obsolescent. Seldom are both bands nearly fused to one ; more often is the external one so enlarged distad that the yellow marginal spots are reduced to dots. The amount of black on the underside of the wings is also variable ; the discal band of both wings is not rarely absent or vestigial, the stigma of the hindwing is sometimes wanting. The skull-mark of the thorax is very seldom absent. The black segmental bands of the abdomen below are complete, and never reduced to mesial spots. Some individuals have the underside of the abdomen nearly all black ; in others, especially often in bred ones, the under surface of the body is fuscous, in which case neither the yellow nor the black bands are clearly defined. On such individuals as the latter Leech's assertion that those black bands are sometimes quite absent from the abdomen of *atropos* may have been based.

We do not find any difference in structure or colour between the Aethiopian and Palaearctic *atropos*, but the tropical specimens are on average, especially in the ♂ sex, smaller than the northern individuals ; we say expressly on an average, as many Aethiopian examples surpass the medium-sized Palaearctic ones. Antenna short and stout, shorter than in the other species, more obviously so in ♀ than in ♂, middle segments in ♀ at least four times as high as long (Pl. LX. f. 20, lateral view). Foretibia a little shorter than in the other species ; foretarsus (Pl. LXIV. f. 1) with numerous spines on the outer side of the first segment, and more than one row on the outerside of the second and third segments ; middle tibia obviously shorter than first tarsal segment, while in the other species it is as long as this ; hinder tibia as long as tarsal segments 1 and 2 together.

♂. Ventral process of harpe (Pl. XXXV. f. 1) dentate, carinate on the upper surface ; the upper process a triangular tooth, the broad sides of both processes vertical.

♀. Vaginal aperture without special armature.

Larva : a green, red-striped, and a brown form.—Food : *Solanaceae*, but also observed feeding on *Fraxinus* and other plants.

Hab. The whole of the Aethiopian Region, the Palaearctic Region as far north as the Shetland and Lofoden Islands (found once) ; eastward to Transcaucasia and North Persia, westwards to the Azores.

In the Tring Museum 80 specimens from various parts of Europe and Continental Africa, Azores, Madagascar, Mauritius, Réunion, besides a number of European larvae and pupae.

9. Acherontia styx.

**Sphinx* (*Acherontia*) *styx* Westwood, *Cab. Or. Ent.* p. 88. t. 42. f. 3 (1848) (E. Indies ;—Mus. Brit.).
Acherontia styx, Moore, in Horsf. & Moore, *Cat. Lep. Mus. E.I.C.* i. p. 266. n. 614 (1857) (Java, Penang, Dukhun, Madras) ; Ménétr., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 93. n. 1555 (1857) (Ind. or.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 6 n. 2 (1875) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 67. n. 88. f. 40 (1892) ; Swinh., *Cat. Lep. Het. Ox.* i. p. 30. n. 121 (1892) ; Piep., *Tijdschr. Ent.* xl. p. 98. t. 1. f. 18. 19 (horn of *l.*) p. 102. t. 4. f. 4 (larva) (1897).
Acherontia iavdasa Moore, *l.c.* (1857) (sub synon.) ; Bartel, *l.c.* ii. p. 25 (1899).

Acherontia atropos, Walker, *Cat. Lep. Het. B.M.* viii. p. 234. n. 1 (1856) (partim) ; Leech, *Proc. Zool. Soc. Lond.* p. 587. n. 29 (1888)*(= *styx* = *medusa* ; Japan, China) ; id., *Tr. Ent. Soc. Lond.* p. 118. n. 89 (1889) (= *medusa* = *styx* ; Kiukiang) ; Mabille, *Bull. Soc. Ent. France* p. 234 (1889) (p. parte) ; Leech, *Tr. Ent. Soc. Lond.* p. 274. n. 32 (1898) (Japan ; Gensan ; = *styx* = *medusa* ; syn. partim) ; Bartel, in Rühl, *Grossschm.* ii. p. 24 (1899) (p. parte).

Acherontia ariel Boisduval, *l.c.* sub syn. (1875) (nom. max. supervac.).

Acherontia satanas, Cuisine, *Bull. Soc. Ent. Fr.* p. 234 (1889) (*satanas* = *atropos* ! Darjiling).

Acherontia atropos var. *styx*, Standinger & Reb., *Cat. Lep.* ed. iii. p. 98. n. 717 *a* (1901).

♂ ♀. The structural differences between *atropos* and *styx* as pointed out below have entirely been overlooked by those authors, cited above, who maintained that the two insects are the same species, though these differences are obvious enough, if one compares the species side by side. The insects are also constantly distinguishable in pattern. *Atropos* cannot even be called an Aethiopian representative of the Indo-Malayan *styx*, for it is by no means nearer related to *styx* than it is to *lachesis*, agreeing with the former in the hindwing having no black subbasal area, with the latter in the black-banded abdominal sternites, the denser spinose outerside of the foretarsus, and the stouter antenna of the ♂.

The skull-mark of the thorax is anteriorly narrower than in *atropos*, and not constricted in the middle ; it is more a likeness of the Neanderthal Schädel than of the skull of a Caucasian with well-developed cranium. The narrowness of the cranial part, so to speak, is due to the greater anterior width of the mesothoracic tegula in *styx*, and the constriction of the mark in *atropos* is partly due to the tegula being widened behind. The abdominal sternites, which, in *atropos*, are always provided with broad black basal bands, bear in *styx* only small mesial basal spots. The anterior tibia is marked with yellow buff, and the tarsi are not ringed with white but with buff. The black subbasal line of the forewing above is less curved distad in the cell. The under surface is paler yellow than in *atropos*.

The individual variability is not inconsiderable. The skull-mark is often black with a pale ochraceous edge, in other individuals it is nearly tawny ochraceous ; it is on the whole more uniform in colour than in *lachesis* and *atropos*. The black bands at the apices of the abdominal tergites are more or less dilated laterally as a rule, sometimes so strongly that they touch each other, at least on the proximal segments. In a good many individuals, however, the dilatation of the bands is not considerable, sometimes very slight. The bluish white line of the metanotum is always present, and rather conspicuous in good specimens. The white or buffish subbasal and discal interspaces between the black dentate lines of the forewing are generally not so pronounced as in *atropos* ; the stigma is buffish. The discal black band of the upperside of the hindwing, on the whole more proximal than in *atropos* and more straight, has not disappeared entirely in any of the specimens examined, but it is reduced in width and length in many examples ; the black outer band of the same wing is mostly more deeply incised between the veins than in *atropos*, often separated into vein-streaks, which are connected with one another by diffuse black scaling. On the *underside* of the forewing there is in most specimens a blackish cloud in the cell along M proximally of middle ; the discal third of wing is generally much shaded with black ; there are two discal bands and the trace of a third ; the second is often rather indistinct, seldom not present as a band or line, the first varies in position, standing sometimes close to the cell. The stigma of the hindwing is occasionally obliterated ; the discal band touches the stigma in some individuals. Size very variable, the smallest specimens from Central and Western China.

♂♀. Antenna much slenderer and obviously longer in both sexes than in specimens of *atropos* of the same size ; the middle segments in the ♀ barely three times as high as long (Pl. LX. f. 21, lateral view). Anterior tibia longer than in *atropos*, first segment (Pl. LXIV. f. 2) slenderer, and, like the other segments, with less spines than in either *atropos* or *lachesis* ; the lateral apical spines obviously prolonged ; the number of spines individually variable as in the other species ; middle tibia as long as the first tarsal segment ; hindtibia equal in length to tarsal segments 1 to 3.

♂. The ventral process of the harpe (Pl. XXXV. f. 3) almost vertical on the plane of the clasper, its broader side nearly horizontal ; the second process triangular as in *atropos*, its broader side dorso-ventral (vertical) ; both processes simple or indistinctly notched. Tenth segment represented by Pl. XXVI. f. 20. 21.

♀. Aperture of vagina without process, but there is a mesial carina running proximad from the rim of the opening.

Larva : according to Swinhoe, *Proc. Zool. Soc. Lond.* p. 290. n. 25 (1885), variable in colour like that of *A. lachesis* ; those feeding on potato bright canary yellow with violet stripes, those feeding on jasmine, *Datura*, *Colea*, and *Erythrina* green with purple stripes bordered with yellow. Swinhoe does not give a distinctive character between the larvae of *lachesis* and *styx*. Moore, *l.c.*, figures the larva of *styx* as green with yellow stripes. Swinhoe may have confounded the larvae of the two species. Further researches are necessary.—Food : *Sesamum*, *Datura*, *Solanum*, *Coccinia*, *Colea*, etc.

Hab. Indo-Malayan Subregion as far north as Japan, eastward to Ceram and Kisser, westward occasionally occurring in Asia Minor ; one specimen received from Barberton, Transvaal (most likely imported to S.E. Africa on board a ship).

Two subspecies :

a. A. styx styx.

**Sphinx* (*Acherontia*) *styx* Westwood, *l.c.*

Acherontia styx, Moore, *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal) ; id., *Lep. Ceyl.* ii. p. 7. t. 76. f. 1. 1*a. b. c.* (*i., l., p.*) (1882) ; Fors., *Tr. Ent. Soc. Lond.* p. 392 (1884) (larva & pupa noticed) ; Swinh., *Proc. Zool. Soc. Lond.* p. 290. n. 25 (1885) (Poona ix., Bombay ix. x. ; *l.* sound, colour variable acc. to food) ; id., *l.c.* p. 435. n. 14 (1886) (Mhow, ix.) ; Warr., *ibid.* p. 293. n. 3 (1888) (Campbellpore, vi.) ; Swinh., *Journ. Bombay N.H. Soc.* iii. p. 119. n. 13 (1888) (Karachi, vii. viii.) ; Dudg., *ibid.* xi. p. 406. n. 88 (1898) (Sikhim ; Bhutan ; up to 6000 ft. ; iv.-vi) ; Nurse, *ibid.* xii. p. 513 (1899) (Cutch).

Acherontia medusa, Moore, *l.c.* (1857) (partim).

Manduca styx, Kirby, *Cat. Lep. Het.* i. p. 700. n. 1 (1892).

♂♀. Forewing above with tawny russet streaks, and a patch of the same colour beyond the greyish white discal lines.

Hab. Continental India : N. India to Ceylon and Tenasserim.

In the Tring Museum 6 ♂♂, 8 ♀♀ from : Ceylon ; South India ; Ajmere, August ; Calcutta ; Khasia Hills ; Sikkim ; Chittagong Hills ; Tenasserim.

b. A. styx crathis nom. nov.

(?) *Spectrum charon* Billberg, *Enum. Ins.* p. 83 (1822) (*nom. nud.* ; Java).

**Acherontia medusa* Moore, in Horsf. & Moore, *Cat. Lep. Mus. E.I.C.* i. p. 267. n. 614 (1857) (sub syn. ; partim ; Java, Penang) ; Butl., *Tr. Zool. Soc. Lond.* ix. p. 597. n. 2. t. 92. f. 10 (*l., p.*) (1877) (Java, China, Philipp., "East India"! Japan) ; id., *Illustr. Typ. Spec. Lep. Het. B.M.* iii. p. 3. t. 41. f. 5 (1879).

Acherontia styx, Moore, *l.c.*; Snell., *Tijdschr. Ent.* xx. p. 4. n. 14 (1877) (Java); id., *l.c.* xxii. p. 63. n. 1. (1879) (S. Celebes); id., *l.c.* xxxiv. p. 253. n. 160 (1891) (Flores); id., in Snellemann, *Fauna Midd. Sumatra* ii. p. 29 (1892) (Ft. de Kock; Soepajang, iv.); Huwe, *Berl. Ent. Zeitschr.* xl. p. 368. n. 43 (1895) (Java); Semp., *Schmett. Philipp.* ii. p. 390. n. 19 (1896) (N.W. Luzon).

♂ ♀. The tawny russet sealing of the forewing above reduced or absent.

Hab. Japan, China, Malay Peninsula eastward over the Malay Archipelago to Kisser and Ceram.—Type: Java.

In the Tring Museum 27 ♂♂, 33 ♀♀ from: Japan, Loo Choo Islands, China, Penang, Sumatra, Borneo, Java, Lombok, Kisser, Celebes, Ceram.

A Borneo ♀ in the K. Naturalienkabinet at München has velvety black forewings with the markings obliterated, except the stigma, a discal line in costal half, a line before hinder angle, and a **3**-shaped submarginal mark at R^2, which are all conspicuous on the dark ground.

IV. COELONIA gen. nov.—Typus: *fulvinotata*.

Sphinx, Boisduval (*non* Linné, 1758), *Faune Madag. Bourb.* p. 76 (1833).
Protoparce, Butler (*non* Burmeister, 1856), *Trans. Zool. Soc. Lond.* ix. p. 606 (1877) (partim).
Phlegethontius, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 687 (1892) (partim).

A connecting link between *Acherontia* and the *Sphingieae*, showing also very close affinities to *Herse* and *Megaeorma*.

♂ ♀. Tongue very long, thicker distally than in *Herse*. Palpus without orifice externally at the end of segment 1; segment 2 obviously shorter than in *Herse*. Antenna of ♂ thinner than in *Herse*, more setiform; of ♀ not clubbed. Tarsi as in *Herse*, but externo-apical spine of segments of foretarsus not much prolonged; paronychium with *two* lobes on each side. Abdomen above with tufts of raised scales. Distal margin of forewing sinuate posteriorly. Clasper with a large patch of broad, multidentate, slightly modified scales. Penis without armature. Lobe covering vaginal orifice large.

Larvae: thorax with paired humps on first and second somite (*fulvinotata*), or with a middle crest of pointed humps on all three tergites (*solani*); horn recurved as in *Acherontia*, tuberculed (*fulvinotata*), or smooth (*solani*).—Food-plants: *Dahlia*, *Solanum*, *Duranta*.

Pupa with free tongue-case, which is not recurved. Underground in a cell.

Hab. Aethiopian Region.

Two species.

If Boisduval's description of the larva of *solani* is correct, the two species differ essentially in the larval as well as in the imago state, *C. fulvinotata* coming nearer *Acherontia*, *solani* approaching somewhat *Herse*.

Key to the species:

Hindwing below with the basi-abdominal region yellow	10. *C. fulvinotata*.
Hindwing below with the basi-abdominal region white	11. *C. solani*.

10. Coelonia fulvinotata.

Sphinx solani, Herrich-Schaeffer (*nec* Boisduval, 1833), *Ausser. Schm.* i. p. 101 (1854); Guen., in Vinson, *Voy. Madag.* p. 30 (1865) (Madag.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 85. n. 19 (1875) (partim); Dew., *Mitth. Münch. Ent. Ver.* iii. p. 26 (1879) (Chinchoxo); Mab., *Bull. Soc. Ent. France* p. 294 (1879) (Madag.); Ploetz, *Stett. Ent. Zeit.* xl. p. 77. n. 287 (1880) (Afr. occ.).

Macrosila solani, Walker, *List Lep. Het. B.M.* viii. p. 206. n. 13 (1856) (Natal, Ashanti, Maurit., Madag.).

**Protoparce fulvinotata* Butler, *Proc. Zool. Soc. Lond.* p. 11 (1875) (S. Africa;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 606. n. 2 (1877) (Natal; Ashanti); Holl., *Trans. Am. Ent. Soc.* xvi. p. 67. n. 26 (1889) (Kangwé, ♀).

**Protoparce mauritii* Butler, *l.c.* n. 3 (1877) (Mauritius, Natal;—Mus. Brit.); Saalm., *Lep. Madag.* p. 132. n. 303 (1884); Fawcett, *Trans. Zool. Soc. Lond.* xv. p. 311. n. 15. t. 48. f. 9. 10. 12 (*l.*) 11 (*p.*) (1901) (life history).

Protoparce solani, Saalm., *l.c.* p. 129. n. 301 (1884) (partim); Druce, in Moloney, *West Afr. Forestry* p. 493 (1887); Möschl., *Abh. Senkenb. Nat. Ges.* xv. p. 70 n. 155 (1890) (Accra).

Phlegethontius fulvinotata, Kirby, *Cat. Lep. Het.* i. p. 687. n. 3 (1892) (S. Africa).

Phlegethontius mauritii, id., *l.c.* n. 4 (1892) (Natal, Maurit.; citat. incorr.).

Phlegethontius solani, id., *l.c.* n. 5 (1892) (Madag.; partim).

♂♀. Often confounded with *solani*, and standing generally under this name in collections. The distinctions given by Butler, *l.c.*, between *fulvinotata* and *mauritii* are individual, but it may nevertheless be true that the insular specimens are a little different from the Continental ones on close examination of a long series. So far we can only say that we do not know of any difference that holds good. The sexes are different in colour, the subapical region of the forewing being whiter in the ♀ than in the ♂. Antenna white at the tip. Metanotum with rosy red hair-scales, reminding one of similarly coloured scales on the thorax of *Acherontia lachesis*.

♂. With a strongly developed procoxal scent-organ (as in *Megacorma*), the long hairs of this organ generally visible without removal of the coxae; in *Acherontia* and *Herse* the organ is vestigial, or at least not so strongly developed, and it is also much less conspicuous in *solani*. Foretibia short, very broad on account of the long dense scaling; foretarsus also short, long-scaled internally. Tenth abdominal tergite as in *Herse convolvuli*, less high before end, but a little broader; sternite with a mesial lobe as in *Megacorma*, but differently shaped (Pl. XXVI. f. 24). Processes of harpe as in *H. convolvuli*, the ventral one longer (Pl. XXV. f. 10).

♀. The flap covering the orifice of the vagina (Pl. XXII. f. 9) much larger than in the species of *Herse*, mesially membranaceous, divided into two flaps (*a*) which become narrower proximally.

Larva and pupa see above.

Hab. Aethiopian Region, from Sierra Leone to Madagascar, Mauritius and Bourbon.

In the Tring Museum 26 ♂♂, 27 ♀♀ from: Sierra Leone (Stevens, x.; Mitford); Bopoto and Yakusu, Upper Congo (K. Smith); Namaqualand; Natal; Zomba, Nyassaland (Dr. P. Rendall, April, May); Mikindani, German E. Africa (Reimer); Butiti, Toro, 7. iv. 99 (Dr. Ansorge); Grande Comore; Madagascar.

11. Coelonia solani.

Sphinx solani Boisduval, *Faune Madag. & Bourb.* p. 76. n. 1. t. 11. f. 2 (1833) (Bourbon ; Mauritius ; descr. of larva & pupa) ; id., *Spec. Gén. Lép. Hét.* i. p. 85. n. 19 (1875) (partim) ; Vins., *Pap. Bourbon* p. 13 (1884) (haec spec. ?).
Sphinx astaroth Boisduval, *l.c.* p. 86. n. 20 (1875) (Brazil ?).
Protoparce solani, Butler, *Trans. Zool. Soc. Lond.* ix. p. 606. n. 4 (1877) (Madag.) ; Saalm., *l.c.* p. 129. n. 301 (1891) (partim).
Protoparce solani var. *grisescens* Saalmüller, *l.c.* p. 129 n. 302. t. 3. p. 37 (1884) (Nossi-bé).
Phlegethontius solani, Kirby, *l.c.* n. 5 (1892) (partim).
Phlegethontius solani var. *a. Prot. s.*, var. *grisescens*, id., *l.c.*
Phlegethontius ashtaroth (!), id., *l.c.* p. 688. n. 7 (1892) (Brazil ?).

♂♀. Boisduval, in 1875, mistook *fulvinotata* for his *solani*, and redescribed a bad specimen of the latter as *astaroth*. Saalmüller, accepting Boisduval's identification of 1875 as correct, gave a detailed description and a good figure of an individual of *solani* under the name of *grisescens*.

The type of *astaroth* is most likely no longer in existence. The type of *solani* is not in Oberthür's collection, but there is a specimen in the Paris Museum which may be the type or a cotype. The original drawing of the figure published by Boisduval is in Oberthür's possession (together with the drawings of all the plates of the *Faune de Madag. & Bourb., Lép.*), and is a very exact likeness of the present insect.

C. solani is much more grey than *fulvinotata*, and differs in many details. The lateral patches of the abdomen are less yellow, being nearly white. The hindwing, above, has the whole basal half yellow, there being within this area only two rather small, oblique, black streaks, one at the base of M^2, the other at SM^2 near the black discal band : beneath, the hindwing is white at the base and along abdominal margin, not yellow. The apical spine of the protarsal segments is longer than in the preceding insect, and the external spines are less numerous.

♂. Foretarsus longer than in *fulvinotata*, scaling not prolonged ; foretibia also longer and much shorter scaled ; forecoxae with the scent-organ small. Tenth tergite of even width (in dorsal view) from near base to beyond middle, then rather suddenly narrowed and again remaining of even width to the apex, which is truncate (Pl. XXVI. f. 22. 23) ; the dorsal surface projecting apicad, the apex appearing to be toothed in a side-view ; tenth sternite longer than in *fulvinotata*, broadly rounded at end. Clasper more oblique ventro-distally than in the preceding species, with an elevated patch of spiniform bristles which nearly reaches to the dorsal margin ; harpe with three instead of two processes, the two corresponding to those of *fulvinotata* both long and pointed, the third shorter, ventral, almost straight, pointing dorso-apicad (Pl. XXXV. f. 9).

♀. Flap in front of the vaginal orifice not divided, rounded, longitudinally wrinkled (Pl. XXII. f. 7).

Larva : according to Boisduval greyish, spotted with black ; head with six black stripes ; three first segments with a dorsal crest composed of rather sharp tubercles ; horn filiform, smooth.

Hab. Bourbon, Mauritius, Madagascar, Comoro Islands. Not on the Continent. A long series from Grande Comore (L. Humblot) in Charles Oberthür's collection.

In the Tring Museum 2 ♂♂, 1 ♀ from : Bourbon (Maillard) ; Grande Comore (Humblot, received from Mons. Charles Oberthür).

Tribe **Sphingicae**.—Typus: *Hyloicus ligustri*.

Manducae Hübner, *Verz. bek. Schm.* p. 138 (1822) (partim).
Sphingini Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 161 (1865) (partim; *nom. nud.*).
"Euryglottides" Boisduval, *Spec. Gén. Lép. Hét.* i. p. 58 (1875) (partim).
Sphinginae Butler, *Trans. Zool. Soc. Lond.* ix. p. 517 (1877) (partim).

♂♀. Tongue varying from being many times as long as the body to being very short. End-segment of antenna always *long*, rough with dispersed long scales and bristles, reduced in length in *Oligographa*. Second segment of palpus on innerside normally scaled, not sunken or only slightly concave, in *Psilogramma* with a naked streak; third segment in some of the otherwise more generalised genera long and prominent; palpus small and rough-scaled in many of the specialised genera. Size of head and eyes very variable; the latter generally lashed in the reduced forms, and the head often crested. Pilifer normal, or the bristles modified into scales. Spinosity of abdomen varying; the spines very weak in the specialised genera, seldom absent; there are always more rows than one to each segment; the spines of the sternites always much weaker than those of the tergites. Tibiae simple or spinose, foretibia often ending in a thorn; proximal pair of spurs of hindtibia present or absent; mid- and hindtarsus with comb or without; the bristles of the comb very long in the generalised forms; foretibia not rarely reduced in length and then armed with stout and long spines externally; pulvillus and paronychium present or absent, the pulvillus disappearing before the paronychium, there being no species with pulvillus and without paronychium, the order in which these organs become obliterated being this: ventral lobes of paronychium, pulvillus, lateral lobes of paronychium.

♂. Some of the lower (= generalised) genera have a strongly developed procoxal scent-organ, a friction-patch on clasper, and a mesially divided tenth segment, or one of these characters; the last two characters occurring only in Old-World forms, none of the numerous American species possessing a friction-patch, or having the tenth tergite mesially divided. Armature of clasper and penis-sheath very variable; the armature of the latter, if there is any, consisting of one, seldom two, apical processes, which are rarely dentate.

♀. Antenna in many cases with traces of the fasciculated ciliae found in the ♀, and more often incrassate distally than in the ♂. Vaginal plate often rather large, and mostly provided with some kind of armature.

Larva cylindrical; head seldom triangular; horn always present, either ⌐-shaped (lowest form), or simply curved; thoracical segments sometimes humped; longitudinally striate, or obliquely banded, or with large patches.—Food-plants: *Coniferae*, *Ligustrum*, *Solanaceae*, *Mentha*, etc.

Pupa: tongue-case reaching tip of wing-cases (except *Ceratomia*), free projecting or not, recurved or not, in one case spirally rolled in (*Cocytius cluentius*).

Hab. Cosmopolitan. More abundant in the New World as regards number of species; of the 112 species known 84 being American belonging to 16 genera, 28 Old-World forms belonging to 17 genera; one of the genera is common to the Palaearctic and Nearctic Regions, there being altogether 32 genera of *Sphingicae*. Only one genus (*Hyloicus*) occurs in the Old and New World, being Holarctic. Africa harbours doubtless many unknown species of this tribe.

The table inserted above shows the gradual reduction of the organs mentioned in the table. It will be observed that the highest forms, or the most reduced in this case, become similar in structure in consequence of the loss or reduction of organs, though the insects are of different origin. Such apparently convergent development is remarkably well illustrated by this tribe of Hawk Moths.

The naked streak on the innerside of the second segment of the palpus reminds one of the palpus of *Theretra* and allies, as do amongst the *Acherontiicae* the palpi of *Megacorma* and *Acherontia*, though in other respects.

The great number of genera in the Old World, and the occurrence in the ♂ of a friction-patch and a completely divided tenth tergite only in some Old-World forms, together with the fact that the *Acherontiicae* are represented in the New World only by one species, and the third tribe *Sphingulicae* not at all, show clearly that the subfamily *Acherontiinae* is of Old-World origin. The same applies to the allied subfamily *Ambulicinae*.

Key to the genera:

a.	Third segment of palpus naked, pointed, prominent	*b.*
	Third segment of palpus not naked . .	*c.*
b.	Long terminal spur of hindtibia a little longer than tibia; clasper with friction-patch (♂)	V. *Xanthopan.*
	Long terminal spur of hindtibia shorter than tibia; clasper without friction-patch	XVII. *Cocytius.*
c.	Pulvillus present	*d.*
	„ absent, or reduced to a short triangular lobe	*t.*
d.	Foretibia with spines	*e.*
	„ simple	*j.*
e.	Two pairs of spurs to hindtibia . .	*f.*
	One pair „ „ „ „ . .	XXXVI. *Thamnoecha.*
f.	Paronychium with two lobes on each side; ground-colour of hindwing yellow	VI. *Panogena.*
	Paronychium with one lobe on each side; ground-colour of hindwing not yellow	*g.*
g.	Spurs densely spinose, long apical one of hindtibia half the length of the first tarsal segment . . .	XVI. *Praedora.*
	Spurs not spinose, long apical one of hindtibia more than half the length of the first tarsal segment . .	*h.*
h.	D^2 of hindwing very oblique, twice the length of D^3; Africa . . .	XI. *Pemba.*
	D^2 of hindwing not very oblique, as long as or shorter than D^3; America . .	*i.*

i.	Long terminal spur of hindtibia equalling in length first tarsal segment .	XXXIII. *Atreus.*
	Long terminal spur of hindtibia obviously shorter than first tarsal segment .	XXVI. *Isogramma.*
j.	Paronychium with two lobes on each side	. *k.*
	„ „ one lobe „ „ „	. *l.*
k.	Long terminal spur of hindtibia half the length of the first tarsal segment; America	XVIII. *Amphomoea.*
	This spur only one-fifth shorter than the tarsal segment; eye not lashed; Oriental Region	VII. *Meganoton.*
	This spur only one-fifth shorter than the tarsal segment; eye lashed; Madagascar	XIII. *Lomocyma.*
l.	End-segment of antenna short . .	XIV. *Oligographa.*
	„ „ „ long . .	. *m.*
m.	Pilifer normal	. *n.*
	„ with bristles and scales . .	XV. *Hoplistropus.*
n.	Second segment of palpus with naked stripe on innerside . . .	X. *Psilogramma.*
	Second segment of palpus without naked stripe on innerside . . .	. *o.*
o.	Eye strongly lashed	. *p.*
	„ not, or feebly, lashed . . .	. *q.*
p.	Spurs long	XXIV. *Dolba.*
	„ short	XXV. *Dolbogene.*
q.	Mesotarsal comb strongly developed, hindtarsus with the bristles of the third row also prolonged near base of tarsus	XIX. *Protoparce.*
	Mesotarsal comb reduced or absent .	. *r.*
r.	Stalk of SC^2 and R^1 of hindwing shorter than D^2; no comb to mesotarsus; America	XX. *Chlaenogramma.*
	Stalk of SC^2 and R^1 of hindwing longer than D^2; mesotarsus with comb; Old World	. *s.*
s.	Tongue longer than body; first segment of foretarsus with some prolonged spines	IX. *Leucomonia.*
	Tongue not longer than body; first segment of foretarsus without some prolonged spines	VIII. *Poliana.*
t.	Foretibia not spinose, or only a few spines at tip, then abdomen with yellow patches	. *u.*
	Foretibia spinose, abdomen without yellow side-patches . . .	. *b'.*

u.	Thorax and legs very rough with erect hair-scales, tongue long	XXI. *Euryglottis*.
	Thorax and legs not rough with erect hair-scales	*v*.
v.	Pilifer normal, with the ordinary yellowish brown bristles	*w*.
	Pilifer with bristles and scales, or the bristles all modified	*z*.
w.	Mesotarsal comb strongly developed, tongue long	*x*.
	Mesotarsal comb absent or vestigial	*y*.
x.	American	XIX. *Protoparce*.
	Oriental; forewing more than 50 mm. long	XXII. *Apocalypsis*.
	Oriental; forming less than 40 mm. long	XXIII. *Pseudodolbina*.
y.	First tarsal segment short, with a few long stout spines, paronychium without lobe	XXVIII. *Isoparce*.
	First tarsal segment short, with a few long stout spines, paronychium with one lobe	*c'*.
z.	Tongue longer than the body, mesotarsal comb present	XXIX. *Nannoparce*.
	Tongue shorter than the body, mesotarsal comb vestigial or absent	*a'*.
a'.	Paronychium with lobes; eye lashed; America	XXXI. *Neogene*.
	Paronychium with lobes; eye not lashed; Australia	XXXII. *Coenotes*.
	Paronychium without lobes; eye not lashed; America	XXX. *Dictyosoma*.
b'.	Abdomen black and white at sides, or tibiae scarcely with any spines	XXXIV. *Hyloicus*.
	Abdomen almost uniform in colour	XXXV. *Lapara*.
c'.	Hindwing above greyish olive-brown	XXVII. *Ceratomia*.
	„ „ ferruginous	XII. *Dovania*.

V. XANTHOPAN gen. nov.—Typus: *morgani*.

Macrosila Walker, *List Lep. Ins. B. M.* viii. p. 198 (1856) (partim).
Protoparce, Butler (*non* Burmeister, 1856), *Trans. Zool. Soc. Lond.* ix. p. 606 (1877).
Amphonyx, Ploetz (*non* Poey, 1832), *Stett. Ent. Zeit.* xli. p. 77 (1880); Möschl., *Abh. Senk. Naturf. Ges.* xv. p. 70 (1890); Auriv., *Ent. Tidskr.* xiii. p. 183 (1892).

♂♀. Pilifer much longer than genal process, which is rounded; tubercle of labrum obtuse, truncate in front. Tongue much longer than the body, carinate laterally at the extreme base. Palpus peculiar: not scaled space of internal surface

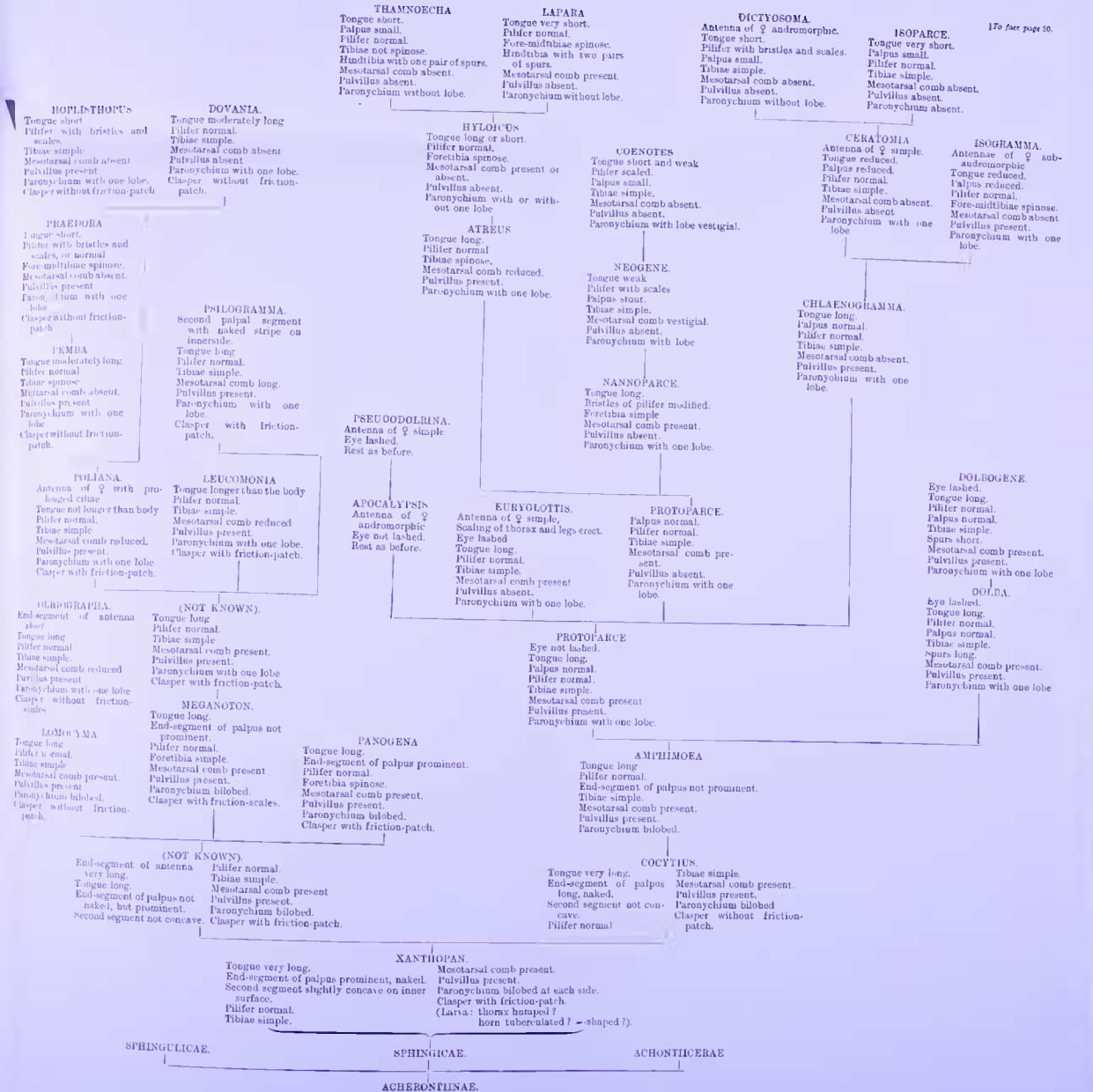
Pilifer norm
Tibiae spino
Midtarsal cc
Pulvillus pre
Paronychiur
lobe.
Clasperwith
patch.

Antenn
longe
Tongue
Pilifer
Tibiae
Mesota
Pulvillu
Paronyc
Clasper

OLIG
End-segmen
short.
Tongue long
Pilifer norm
Tibiae simp
Mesotarsal
Puvillus pre
Paronychiu
Clasper wi
scales.

LOM
Tongue long
Pilifer norm
Tibiae simp
Mesotarsal
Pulvillus pr
Paronychiu
Clasper wi
patch.

BRITISH MUSEUM
NATURAL HISTORY


THAMNOECHA
Tongue short.
Palpus small.
Pilifer normal.
Tibiae not spinose.
Hindtibia with one pair of spurs.
Mesotarsal comb absent.
Pulvillus absent.
Paronychium without lobe.
LAPARA
Tongue very short.
Pilifer normal.
Fore-midtibiae spinose.
Hindtibia with two pairs of spurs.
Mesotarsal comb present.
Pulvillus absent.
Paronychium without lobe.
DICTYOSOMA.
Antenna of ♀ andromorphic.
Tongue short.
Pilifer with bristles and scales.
Palpus small.
Tibiae simple.
Mesotarsal comb absent.
Pulvillus absent.
Paronychium without lobe.
ISOPARCE.
Tongue very short.
Palpus small.
Pilifer normal.
Tibiae simple.
Mesotarsal comb absent.
Pulvillus absent.
Paronychium absent.
17o face page 80.
HOPLISTHOPUS
Tongue short
Pilifer with bristles and scales.
Tibiae simple
Mesotarsal comb absent
Pulvillus present
Paronychium with one lobe.
Clasper without friction-patch
DOVANIA.
Tongue moderately long
Pilifer normal.
Tibiae simple.
Mesotarsal comb absent
Pulvillus absent
Paronychium with one lobe.
Clasper without friction-patch.
HYLOICUS
Tongue long or short.
Pilifer normal.
Foretibia spinose.
Mesotarsal comb present or absent.
Pulvillus absent.
Paronychium with or without one lobe
COENOTES
Tongue short and weak
Pilifer scaled.
Palpus small.
Tibiae simple.
Mesotarsal comb absent.
Pulvillus absent.
Paronychium with lobe vestigial.
CERATOMIA
Antenna of ♀ simple.
Tongue reduced.
Palpus reduced.
Pilifer normal.
Tibiae simple.
Mesotarsal comb absent.
Pulvillus absent
Paronychium with one lobe
ISOGRAMMA.
Antennae of ♀ subandromorphic
Tongue reduced.
Palpus reduced.
Pilifer normal.
Fore-midtibiae spinose.
Mesotarsal comb absent
Pulvillus present.
Paronychium with one lobe.
PRAEDORA
Tongue short.
Pilifer with bristles and scales, or normal
Fore-midtibiae spinose.
Mesotarsal comb absent.
Pulvillus present
Paronychium with one lobe
Clasper without friction-patch
ATREUS
Tongue long.
Pilifer normal
Tibiae spinose.
Mesotarsal comb reduced.
Pulvillus present.
Paronychium with one lobe.
NEOGENE.
Tongue weak
Pilifer with scales
Palpus stout.
Tibiae simple.
Mesotarsal comb vestigial.
Pulvillus absent.
Paronychium with lobe
CHLAENOGRAMMA.
Tongue long.
Palpus normal.
Pilifer normal.
Tibiae simple.
Mesotarsal comb absent.
Pulvillus present.
Paronychium with one lobe.
PEMBA
Tongue moderately long
Pilifer normal
Tibiae spinose
Metatarsal comb absent.
Pulvillus present
Paronychium with one lobe
Clasper without friction-patch.
PSILOGRAMMA.
Second palpal segment with naked stripe on innerside.
Tongue long
Pilifer normal.
Tibiae simple.
Mesotarsal comb long.
Pulvillus present.
Paronychium with one lobe.
Clasper with friction-patch.
NANNOPARCE.
Tongue long.
Bristles of pilifer modified.
Foretibia simple
Mesotarsal comb present.
Pulvillus absent.
Paronychium with one lobe.
PSEUDODOLBINA.
Antenna of ♀ simple
Eye lashed.
Rest as before.
POLIANA.
Antenna of ♀ with prolonged cilia
Tongue not longer than body
Pilifer normal.
Tibiae simple
Mesotarsal comb reduced.
Pulvillus present.
Paronychium with one lobe
Clasper with friction-patch.
LEUCOMONIA
Tongue longer than the body
Pilifer normal.
Tibiae simple.
Mesotarsal comb reduced
Pulvillus present.
Paronychium with one lobe.
Clasper with friction-patch.
APOCALYPSIS
Antenna of ♀ andromorphic
Eye not lashed.
Rest as before.
EURYOLOTTIS.
Antenna of ♀ simple,
Scaling of thorax and legs erect.
Eye lashed
Tongue long.
Pilifer normal.
Tibiae simple.
Mesotarsal comb present
Pulvillus absent.
Paronychium with one lobe.
PROTOPARCE.
Palpus normal.
Pilifer normal.
Tibiae simple.
Mesotarsal comb present.
Pulvillus absent.
Paronychium with one lobe.
DOLBOGENE.
Eye lashed.
Tongue long.
Pilifer normal.
Palpus normal.
Tibiae simple.
Spurs short.
Mesotarsal comb present.
Pulvillus present.
Paronychium with one lobe
DOLBA.
Eye lashed.
Tongue long.
Pilifer normal.
Palpus normal.
Tibiae simple.
Spurs long.
Mesotarsal comb present.
Pulvillus present.
Paronychium with one lobe
PROTOPARCE
Eye not lashed.
Tongue long.
Palpus normal.
Pilifer normal.
Tibiae simple.
Mesotarsal comb present
Pulvillus present.
Paronychium with one lobe.
AMPHIMOEA
Tongue long
Pilifer normal.
End-segment of palpus not prominent.
Tibiae simple.
Mesotarsal comb present.
Pulvillus present.
Paronychium bilobed.
COCYTIUS.
Tongue very long.
End-segment of palpus long, naked.
Second segment not concave.
Pilifer normal
Tibiae simple.
Mesotarsal comb present.
Pulvillus present.
Paronychium bilobed
Clasper without friction-patch.
DILOBOGRAPHA.
End-segment of antenna short
Tongue long
Pilifer normal
Tibiae simple
Mesotarsal comb reduced
Pulvillus present
Paronychium with one lobe
Clasper without friction-scales
(NOT KNOWN).
Tongue long
Pilifer normal.
Tibiae simple
Mesotarsal comb present.
Pulvillus present.
Paronychium with one lobe
Clasper with friction-patch.
MEGANOTON.
Tongue long.
End-segment of palpus not prominent.
Pilifer normal.
Foretibia simple.
Mesotarsal comb present
Pulvillus present.
Paronychium bilobed.
Clasper with friction-scales.
LOMOCYMA
Tongue long
Pilifer normal.
Tibiae simple
Mesotarsal comb present.
Pulvillus present
Paronychium bilobed.
Clasper without friction-patch.
PANOGENA
Tongue long.
End-segment of palpus prominent.
Pilifer normal.
Foretibia spinose.
Mesotarsal comb present.
Pulvillus present.
Paronychium bilobed.
Clasper with friction-patch.
(NOT KNOWN).
End-segment of antenna very long.
Tongue long.
End-segment of palpus not naked, but prominent.
Second segment not concave.
Pilifer normal.
Tibiae simple.
Mesotarsal comb present
Pulvillus present.
Paronychium bilobed.
Clasper with friction-patch.
XANTHOPAN.
Tongue very long.
End-segment of palpus prominent, naked.
Second segment slightly concave on inner surface.
Pilifer normal.
Tibiae simple.
Mesotarsal comb present.
Pulvillus present.
Paronychium bilobed at each side.
Clasper with friction-patch.
(Larva: thorax humped? horn tuberculated? ∴-shaped?).
SPHINGULICAE.
SPHINGICAE.
ACHONTICERAE
ACHERONTINAE.

of first segment with long hairs; internal surface of second segment *concave* nearly as in *Acherontiicae*, but densely scaled; third segment conical, naked at end, projecting as in *Cocytius*. Antenna of even width from near base to hook, very slender in ♀, with long end-segment, which is rough with long broad scales; penultimate segment as long as high (♂), or a little longer, the preceding ones gradually much higher than long; hook long and slender. Tibiae *not spiny*; segment 1 of foretarsus as long as tibia, but shorter than segments 2 to 5 together, with three rows of spines externally, row 1 being doubled; there are, moreover, numerous intermediate spines, so that the rows become irregular, spines of normal row 2 a little longer than those of row 1; first segment of midtarsus one-fourth, that of hindtarsus one-third longer than the other segments together; comb of midtarsus basal, followed by a number of thin and short bristles or spines, so that the remainder of row 4 appears to be separated from the comb by a gap; spines of row 3 of first hindtarsal segment gradually longer basad, forming a comb of rather stout spines; spurs long, very unequal, short one of midtibia half the length of long one, or less; long distal one of hindtibia one-third shorter than the first tarsal segment; pulvillus present, paronychium with *two* lobes at each side. Distal margin of forewing sinuate before posterior angle.

Early stages unknown.

Hab. Africa and Madagascar, occurring most likely also on the Comoro Islands.—One species.

As explained above, this genus connects the *Acherontiicae* with the *Sphingicae*. The prolonged third palpal segment it has in common with *Cocytius* (= *Amphonyx*); an obvious similarity with one species of *Cocytius* (*C. cluentius*) exists also in the tenth abdominal tergite of the ♂.

12. Xanthopan morgani.

**Macrosila morgani* Walker, *List Lep. Ins. B.M.* viii. p. 206. n. 12 (1856) (Sierra Leone; Congo;—Mus. Brit.)

Protoparce morgani, Butler, *Trans. Zool. Soc. Lond.* ix. p. 607. n. 5 (1877).

Amphonyx morgani, Ploetz, *Stett. Ent. Zeit.* xli. p. 77. n. 288 (1880) (Fernando Po); Möschl., *Abh. Senk. Naturf. Ges.* xv. p. 70. n. 156 (1890) (Gold Coast); Auriv., *Ent. Tidskr.* xiii. p. 183. n. 231 (1892) (Cameroons, 1 ♂).

Phlegethontius morgani, Kirby, *Cat. Lep. Het.* i. p. 688. n. 10 (1892) (Afr. occ.; syn. ex parte).

♂ ♀. Segments 2 to 4 of foretarsus almost black.

♂. Tenth abdominal tergite curved, dilated at the end, which is divided into three lobes; the side-lobes are broad, obliquely rounded, while the middle lobe is gradually narrowed to a point (Pl. XXVI. f. 25. 26. 27), the tergite resembling that of *C. cluentius*; sternite long, dilated at end, truncate-sinuate, the sides turned upwards as triangular lobes. Clasper round at end, ventral margin almost straight, oblique; a small patch of modified scales; harpe (Pl. XXXV. f. 13) basally with a high oblique ridge, vertical upon the plane of the clasper, mesially dilated-rounded dorsally, apex truncate, with the edge raised, produced dorsad into a short hook, apical part of harpe clothed with stiff hairs; a patch of long bristles above the base of the harpe. Penis-funnel prolonged dorsally, rounded at end, forming a half-cylinder, which surrounds the penis-sheath and is deeply sinuate ventrally at the base; the funnel is armed with two lobes (Pl. XXVIII. f. 30, P-F); penis-sheath ending in a short, flattened, obtuse process which is separated from the sheath on one side by an incision.

♀. Postvaginal plate triangular, scaled laterally, separated from the vaginal plate by a narrow strip of membrane ; vaginal opening longitudinal, the side-edges of the opening raised to ridges, which terminate abruptly distally, while they become gradually lower proximally (Pl. XXII. f. 6).

Hab. Aethiopian Region.—Two subspecies.

a. P. morgani morgani.

**Macrosila morgani* Walker, *l.c.*

♂ ♀. Underside of abdomen white.

Hab. West and East Africa.

In the Tring Museum 8 ♂♂, 2 ♀♀ from : Sierra Leone ; Upper Congo ; Cubal River, Angola, March 1899 (Penrice) ; Dar-es-Salaam.

b. P. morgani praedicta subsp. nov.

♂ ♀. Breast and abdomen beneath with an obvious pinkish tint. Upperside of body and forewing, and underside of wings also somewhat pinkish. Black apical line of forewing, extending from costal to distal margin, broader than in the preceding, black discal streak R^3—M^1 also heavier.

Hab. Madagascar.

Type (♂) in coll. Charles Oberthür ; a *female* specimen in coll. Mabille.

Wallace, in *Natural Selection*, p. 146 (1891), speaking of the adjustment between the length of the nectary of orchids and that of the proboscis of insects, says : " In the case of *Angraecum sesquipedale* it is necessary that the proboscis should be forced into a particular part of the flower, and this would only be done by a large moth burying its proboscis to the very base, and straining to drain the nectar from the bottom of the long tube, in which it occupies a depth of one or two inches only. . . . I have carefully measured the proboscis of a specimen of *Macrosila cluentius* from South America, in the collection of the British Museum, and find it to be nine inches and a quarter long ! One from tropical Africa (*Macrosila morgani*) is seven inches and a half. A species having a proboscis two or three inches longer could reach the nectar in the largest flowers of *Angraecum sesquipedale*, whose nectaries vary in length from ten to fourteen inches. That such a moth exists in Madagascar may be safely predicted, and naturalists who visit that island should search for it with as much confidence as astronomers searched for the planet Neptune,—and I venture to predict they will be equally successful."

As the tongue of *P. morgani praedicta* is long enough—about 225 mm. = 8 inches—to reach the honey in short and medium-sized nectaries of *Angraecum*, the moths will not abandon the flowers with especially long nectary without trying to reach the fluid, which fills up, in hot-house specimens of *Angraecum*, about one-fourth of the nectary. The result would be that flowers with exceptionally long nectaries would be as well fertilised as such with short nectaries by a moth which could reach the fluid in the long nectaries only when a greater quantity of nectar had collected. *P. morgani praedicta* can do for *Angraecum* what is necessary ; we do not believe that there exists in Madagascar a moth with a longer tongue than is found in this Sphingid.

VI. PANOGENA gen. nov.—Typus: *jasmini*.

Sphinx, Boisduval (*non* Linné, 1758), *Spec. Gén. Lép. Hét.* i. p. 69 (1875) (partim).
Diludia, Butler (*non* Grote & Rob., 1865), *Proc. Zool. Soc. Lond.* p. 168 (1877).
Protoparce, id., *l.c.* p. 169 (1877).
Meganoton, Kirby (*non* Boisduval, 1875), *Cat. Lep. Het.* i. p. 682 (1892) (partim).
Phlegethontius, id. (*non* Hübner, 1822), *l.c.* p. 687 (1892).

The two species treated under this new term come in general appearance as well as in structure close to *Xanthopan*. They differ *inter se* rather obviously in the one species (*jasmini*) having the midtibia spinose, while they are not spiny in the other (*lingens*), in this respect *jasmini* being the more specialised species.

♂ ♀. Genal process triangular, almost reaching to the end of the pilifer. Not scaled inner surface of first palpal segment quite naked; third segment more or less prominent, its tip *not* naked; inner surface of second segment not concave. Foretibia *spinose*, midtibia with or without spines; first protarsal segment as long as, or shorter than, the four others together; mid- and hindtarsus with comb, bristles of midtarsal comb gradually shorter, assuming gradually the length and stoutness of the more distal spines, the comb differing in this respect obviously from that of *Xanthopan*; short spur of midtibia about half the length of the long one; first segment of hindtarsus at least half as long again as segments 2 to 5 together; pulvillus present; paronychium with two lobes at each side.

♂. Clasper with a patch of broad friction-scales, the scales nearly all minutely dentate. Tenth tergite elongate, pointed, not divided, clothed with some long stiff hairs; sternite elongate-triangular. Penis-sheath with a long, slender, recurved process, which points proximad and lies more or less closely upon the sheath.

♀. Eighth sternite short; orifice of vagina transverse.

Early stages not known.

Hab. Madagascar.—Two species, both with the ground colour of the hindwing yellow.

Midtibia spinose; black discal band of hindwing not dilated basad behind cell, base of hindwing all yellow . . . . . 13. *P. jasmini*.

Midtibia not spinose; black discal band of hindwing dilated basad, extreme base black . . . . 14. *P. lingens*.

13. Panogena jasmini.

**Sphinx jasmini* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 114. n. 55 (1875) (Tananarivo;—coll. Charles Oberthür); Mab., *Ann. Soc. Ent. France* p. 295 (1879) (Madag.).
**Diludia chromapteris* Butler, *Proc. Zool. Soc. Lond.* p. 168 (1877) (Madag.;—Mus. Brit.); Saalm., *Lep. Madag.* p. 132. n. 307 (1884).
Diludia jasmini, id., *l.c.* n. 306 (1884).
Meganoton jasmini, Kirby, *Cat. Lep. Het.* i. p. 683. n. 22 (1892) (Madag.).

♂ ♀. Body and forewing whitish grey; abdomen with whitish grey lateral patches. Midtibia spinose; first segment of foretarsus shorter than segments 2 to 5 together, with some prolonged spines; long terminal spur of hindtibia about ⅔ the length of first tarsal segment. Third segment of palpus rather prominent.

♂. Tenth abdominal tergite gradually narrowed to a point, slightly curved, with some long stiff hairs, upperside strongly convex, extreme end suddenly hooked; sternite little shorter than the tergite, elongate-triangular, flat, the sides

distally not turned upwards, apex obtusely pointed. Clasper: patch of large friction-scales on the outer side not sharply defined, dentition of these scales rather heavy; harpe indicated by an incrassation of the ventral margin of the clasper, densely clothed with short scales; *no* free process. Penis-sheath: pointed process apically curving laterad (Pl. XXVIII. f. 36).

♀. Vaginal plate short: a flat, transverse, rounded ridge behind the vaginal opening more strongly chitinised, brown, the rest of the plate membranous; mouth of vagina transverse, subapical (Pl. XXI. f. 9), the membrane convex mesially on account of the internal vaginal tube being rather strongly chitinised.

Hab. Madagascar, apparently all over the island in suitable places.

In the Tring Museum 10 ♂♂, 1 ♀.

14. Panogena lingens.

**Protoparce lingens* Butler, *Proc. Zool. Soc. Lond.* p. 169 (1877) (Madag.;—Mus. Brit.); Saalm., *Lep. Madag.* p. 132. n. 304 (1884) (Nossi-bé).

Sphinx lingens, Mabille, *Ann. Soc. Ent. France* p. 295 (1879) (Madag.).

Phlegethontius lingens, Kirby, *Cat. Lep. Het.* i. p. 687. n. 6 (1892).

♂♀. Much darker than the preceding; abdomen with yellow lateral patches. The yellow discal band of the hindwing sometimes reaching costal margin, but mostly shaded with black or brown in anterior half. Third segment of palpus less prominent than in *jasmini*. Midtibia not spiny; first segment of foretarsus as long as segments 2 to 4 together; long terminal spur of hindtibia not much over half the length of the first tarsal segment. Antennae of ♂ thicker than in *jasmini*.

♂. Tenth abdominal segment not obviously different from that of *jasmini*, the sternite less flat, the margins somewhat turned upwards. Clasper: patch of modified scales longer, better defined, the scales less denticulate; harpe small, not scaled on the inner surface, but clothed with some hairs, with two apical tooth-like processes, both triangular, one pointing distad, the other dorsad (Pl. XXXV. f. 11). Process of penis-sheath as in *jasmini*, less curved apically, with a minute tooth-like carina before end.

♀. Vaginal plate as short as in *jasmini*, especially the postvaginal portion, which is reduced to a transverse stripe; much more chitinised than in *jasmini* except quite proximally; mouth of vagina very transverse, covered in front by a rounded, transverse ridge, which is mesially sharply rounded-sinuate (Pl. XXI. f. 10).

Hab. Madagascar; apparently rarer than the preceding.

In the Tring Museum 4 ♂♂, 2 ♀♀.

This and the preceding may perhaps be generically distinct from one another. The differences in structure which we have found are noted above; the spinosity of the midtibia in *jasmini* is the most prominent difference.

VII. MEGANOTON.—Typus: *nyctiphanes*.

Macrosila Walker, *List Lep. Ins. B.M.* viii. p. 198 (1856) (partim).

Meganoton Boisduval, *Spec. Gén. Lép. Hét.* i. p. 58 (1875) (partim; type: *nyctiphanes*); Kirby, *Cat. Lep. Het.* i. p. 682 (1892).

Sphinx, Boisduval (*non* Linné, 1758), *l.c.* p. 69 (1875).

Diludia, Butler (*non* Grote & Rob., 1865), *Trans. Zool. Soc. Lond.* ix. p. 612 (1877) (partim).
Pseudosphinx, id. (*non* Burmeister, 1856), *Illust. Typ. Spec. Lep. Het. B.M.* v. p. 15 (1881); Hamps., in Blanf, *Fauna Brit. Ind., Moths* i. p. 104 (1892).

♂♀. Antenna long and slender, with a long and slender hook. Palpus large, prominent, second segment almost as broad in side-view as long. Eyes large, not lashed. Legs long; tibiae *not* spiny; foretarsus without prolonged spines, first segment *shorter* than segments 2 to 5 together; midtarsus with very strong basal comb which terminates abruptly, being continued by much shorter bristles; comb of hindtarsus also prominent, the spines gradually shortening distad; spurs long, long apical one of hindtibia at least two-thirds the length of the first tarsal segment, which is *longer* than the tibia and also than the other four segments together; hindtarsus *more than twice* the length of the cell of the hindwing (measured along SC); SC^2 and R^1 of hindwing on a rather long stalk; D^2 very oblique. With pulvillus and paronychium, the latter with *two* flaps on each side.

♂. Clasper with patch of modified scales on outer side; penis-sheath armed at end with one or two long tapering processes which are curved basad (Pl. XXVIII. f. 33. 34. 35).

Larva (of *nyctiphanes*; not known of the other species) with the third thoracical segment mesially produced into a conical tubercle; horn tubercled, curving upwards, --shaped.

Pupa (of *nyctiphanes*) with free tongue-case, which is not recurved.

Hab. Oriental Region.—Three species.

Key to the species:

a. Hindwing with several pale spots on the disc — 15. *M. nyctiphanes*.
Hindwing without pale spots on the disc . . *b*.
b. Abdomen with yellow lateral patches . . — 16. *M. rufescens*.
„ without yellow lateral patches . — 17. *M. analis*.

15. Meganoton nyctiphanes.

**Macrosila nyctiphanes* Walker, *List Lep. Ins. B.M.* viii. p. 209. n. 16 (1856) (Silhet;—Mus. Brit.); Moore, in Horsf. & Moore, *Cat. Lep. Mus. E.I.C.* i. p. 268. n. 617 (1857) (Silhet); id., *Proc. Zool. Soc. Lond.* p. 675 (1867) (Silhet).
Macrosila nyctiphares (!), Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 89. n. 1469 (1857) (Ind. or.).
Meganoton nyctiphanes, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 59. n. 1 (1875) (N. Ind.); Kirby, *Cat. Lep. Het.* i. p. 682. n. 6 (1892) (Silhet).
**Pseudosphinx cyrtolophia* Butler, *Proc. Zool. Soc.* p. 259 (1875) (Madras;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 611. n. 7. t. 91. f. 11-13. t. 92. f. 6 (1877) (larva, pupa).
Hyloicus cyrtolophia, Kirby, *l.c.* p. 694. n. 8 (1892) (Madras).
Pseudosphinx nyctiphanes, Butler, *Trans. Zool. Soc. Lond.* ix. p. 610. n. 6 (1877); id., *Illust. Typ. Spec. Lep. Het. B.M.* v. p. 15. t. 81. f. 7 (1881); Pagenst., *Iris* iii. p. 2. n. 2. (1890) (Palawan); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 105. n. 167. f. 59 (*l., p.*) (1892) (Silhet, Andamans, Perak, Singapore); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 32. n. 125 (1892) (Silhet, Singapore); Semp., *Schm. Philipp.* ii. p. 405. n. 53 (1896) (Palawan).
Pseudosphinx cyrtolophia, Hampson, *l.c.* n. 168 (1892) (Madras).

♂♀. Rather variable in size. Ground colour of forewing in some specimens darker, in others paler, in the latter case the lines more prominent; outer margin undulate; pale band of hindwing not quite constant in position. Eye large, palpus very large, third segment distinct. First segment of foretarsus as long as segments

2 to 4 together. Row 2 of spines of hindtarsus (segment I) beginning at basal fourth.

♂. Tenth tergite long, compressed, carinate below, highest beyond middle, strongly curved at base, then nearly straight, and at apex again curved, tip truncate: the broad and rather long lobe of the sternite flat, slightly curved upwards, deeply sinuate, each half rounded externally, angulated at the sinus. Clasper broad, dilated dorsad before middle, long hair-scales of dorsal margin and scaling proximally of patch of modified scales white; this patch clay-colour, large, the scales small, very close together, longer than broad, somewhat narrowed at end, bidentate (Pl. LVIII. f. 35); harpe with a spatulate process, which is curved upwards at end, the oblique upper edge irregularly notched and toothed (Pl. XXXV. f. 12). Penis-sheath with *two* long processes close together, one longer than the other (Pl. XXVIII. f. 33), the longer one denticulate. Eighth segment laterally tufted; on the inner surface on each side with a series of large friction-scales (Pl. LIX. f. 2), which are *not* present in the other two species of the genus.

♀. Vaginal plate (Pl. XXI. f. 16) much folded, raised mesially from base to vaginal cavity; the proximal edge of the latter raised into a double tubercle.

Larva and chrysalis see above.

The type of *cyrtolophia* is a small ♀ of this species; there is no difference between it and *nyctiphanes* either in colour or structure; the vaginal plate is as in *nyctiphanes*; the wings are very much broken at the tips.

Hab. North and South India, Ceylon, Andamans, Burmah, Malacca, Borneo, Palawan.

In the Tring Museum 13 ♂♂, 10 ♀♀ from: Ceylon; Khasia Hills (October); Jaintia Hills; Burmah; Perak; Penang, 20. vi. '98 (C. Curtis); Andamans; Sarawak; Palawan.

16. **Meganoton rufescens.**

**Diludia rufescens* Butler, *Proc. Zool. Soc. Lond.* p. 260. n. 57 (1875) (N. India;—Brit. Mus.).
Diludia rubescens id., *Trans. Zool. Soc. Lond.* ix. p. 615. n. 18 (1877) (*nom. nov.*).
Pseudosphinx discistriga, Hampson (*non* Walker, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 105. n. 169 (1892) (partim).

♂♀. Palpus as large as in *nyctiphanes*, second segment shorter than broad (scaling included). Antenna of ♂ rather thicker than in *nyctiphanes*. Abdomen with 3 or 4 distinct yellow side-patches bordered above by a black continuous band.

The species bears a remarkable resemblance to the American *Cocytius lucifer*, as well as to dark specimens of the Oriental *Psilogramma menephron*, with which Sir George Hampson confounded it.

As Butler's earlier *Diludia rufescens* and the present insect belong to two different genera, there is no necessity to reject the name of *rufescens* for this *Meganoton*.

♂. Tenth abdominal segment very peculiar (Pl. XXVI. f. 30. 31. 32): the tergite gently curved, strongly spatulate, the sides of the dilated apical portion clothed with some long stiff hairs and turned downwards, apical margin rounded-truncate (Pl. XXVI. f. 30, dorsal view); the tergite thin; the sternite longer than the tergite, suddenly turned upwards near end, and, moreover, produced at the curvature into an obtuse process (Pl. XXVI. f. 31), which is compressed like the vertical cleft apical part of the sternite (Pl. XXVI. f. 32). Clasper: ventral margin oblique; dorsal one first straight, then somewhat dilated and turned inward; apex obliquely rounded; patch of friction-scales clay-colour, the scales large and multi-

dentate ; harpe produced into a curved, almost finger-like, pointed, ventral process (Pl. XXXV. f. 15), the oblique upper margin dilated into a triangular lobe, which is armed with teeth. Penis-sheath with one curved process, which is less than twice as long as the sheath is wide (Pl. XXVIII. f. 34) ; the process recurved towards the sheath.

♀. Vaginal plate (Pl. XXI. f. 14) rather strongly chitinised, glabrous, convex mesially, vaginal cavity before middle, covered by a long sinuate-truncate lobe which narrows distad.

Early stages not known.

Hab. North India to Queensland ; rare, few specimens in collections.

Two subspecies :

a. M. rufescens rufescens.

**Diludia rufescens* Butler, *l.c.* (1875).
Diludia rubescens, Swinhoe, *Cat. Lep. Het. Ox.* i. p. 33. n. 131 (1892) (Silhet).
Meganoton rubescens, Kirby, *Cat. Lep. Het.* i. p. 682. n. 9 (1892).
Pseudosphinx discistriga, Hampson, *l.c.* (partim).
**Meganoton cocytioides* Rothschild, Nov. Zool. i. p. 543 (1894) (Andamans, Labuan, Mindanao).

♂♀. A smaller form than the following ; sides of mesothoracic tegulae of the same clayish brown colour as the forewing ; margin of hindwing almost even ; fringe of both wings less extended white ; underside of both wings darker. Harpe of ♂ : the dorsal lobe with several prominent teeth.

There is perhaps a darker continental and a paler brown insular form.

Hab. North India : Sikkim, Silhet; Andamans; Borneo; Mindanao; Sula Islands.

In the Tring Museum : Sikkim, 3 ♂♂ ; Sula Mangioli (W. Doherty, Nov. 1897), 1 ♀.

Our Sula specimen has much paler forewings than the Sikkim ♂♂, and the transverse dentate lines are more or less obliterated.

b. M. rufescens severina.

Macrosila severina Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 25. n. 42 (1891) (Cape York).
Meganoton severina, Kirby, *Cat. Lep. Het.* i. p. 683. n. 17 (1892).
**Meganoton cocytioides* Rothschild, Nov. Zool. i. p. 89 (1894) (Pt. Mackay ;—Mus. Tring) ; id., *l.c.* iii. t. 13. f. 6 (♀) (1896).
Pseudosphinx discistriga, Hampson, *l.c.* iv. p. 453. n. 169 (1896).

♂♀. Sides of mesothoracic tegulae buffish white, strongly contrasting with the forewing. Forewing above shaded with olive-grey scales, especially in post-discal and basal regions, the oblique streak in apex of cell centred with brown, a separate black spot at upper angle of cell. Hindwing, above, paler at costal and abdominal margins than in the preceding form, the pale discal band more distinctly indicated, especially at anal angle, outer margin distinctly scalloped. On the underside, the internal margin of the forewing very pale. Harpe (Pl. XXXV. f. 15) ; the dorsal lobe produced into one large tooth, besides some minute ones. Tenth segment see Pl. XXVI. f. 30. 31. 32.

Hab. North Queensland.

In the Tring Museum 1♂, 2 ♀♀ from Pt. Mackay.

17. Meganoton analis.

**Sphinx analis* Felder, *Reise Novara, Lep.* t. 78. f. 4 (1874) (Shanghai ;—Mus. Tring) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 111. n. 51 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 613. n. 5 (1877) (hab. ?).

**Diludia grandis* id., *Proc. Zool. Soc. Lond.* p. 260. n. 56 (1875) (Nepal ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 614. n. 11 (1877) (Nepal).

**Diludia tranquillaris* id., *l.c.* p. 641 (1877) (Darjiling ;—coll. Staudinger) ; Moore, *Descr. Lep. Atk.* p. 7 (1879).

Pseudosphinx discistriga, Hampson (*non* Walker, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 105. n. 169 (1892) (partim).

♂ ♀. Distal margin of forewing not undulate as in the two preceding species, shallowly sinuate before posterior angle. Second segment of palpus rather smaller than in the other species. Row 2 of spines of first segment of hindtarsus extending close to the base as in *Psilogramma*.

♂. Tenth tergite divided into two long and slender processes, which are regularly curved downward and gradually narrowed to a point (Pl. XXVI. f. 33) ; the processes approach each other a little in middle : the sternite is produced into a long cylindrical process, which is slightly bent downwards at end, the apex obtuse. Clasper sole-shaped, dorsal margin bent inwards ; the large clay-coloured patch of modified scales on the outer side consisting of large, multidentate, ribbed scales ; harpe ladle-shaped, minutely dentate (Pl. XXXV. f. 14) ; subdorsal longitudinal groove of clasper sharply defined, deep, the fold below it with long bristles. Penis-sheath with one pointed process (Pl. XXVIII. f. 35), which is rather broad at base. Eighth tergite *without* friction-scales on the inner surface.

♀. Vaginal plate (Pl. XXI. f. 15) very feebly chitinised, the whole postvaginal part membranous and scaled, the antevaginal part also membranaceous ; from the vaginal cavity a narrow stripe of chitin extends to each side ; the upper edges of these plates continuous, forming an arcuate ridge which borders the vaginal cavity behind ; the proximal edge of the cavity formed by a very thin membranous fold, which is preceded by a stronger fold.

Early stages not known.

The species is a connecting link between *Meganoton* and *Psilogramma*.

Hab. China ; North India.

In the Tring Museum 3 ♂♂, 4 ♀♀ from : Shanghai ; Darjiling (Pilcher) ; Khasia Hills ; Cherrapunji.

VIII. POLIANA gen. nov.—Typus : *buchholzi*.

Diludia, Butler (*non* Grote & Rob., 1865), *Proc. Zool. Soc. Lond.* p. 13 (1875).
Sphinx, Plötz (*non* Linné, 1758), *Stett. Ent. Zeit.* xli. p. 76 (1880).
Protopurce, Druce (*non* Burmeister, 1856), *Ent. Mo. Mag.* xix. p. 18 (1882).
Meganoton, Kirby (*non* Boisduval, 1875), *Cat. Lep. Het.* i. p. 683 (1892).
Phlegethontius, id. (*non* Hübner, 1822), *l.c.* p. 688 (1892).

♂ ♀. Tongue as long as, or shorter than, the body. Genal process about as high as pilifer. Segment 2 of palpus as long as 1. Antenna with short hook, penultimate segment much shorter than high. First segment of foretarsus multispinose exteriorly at the base, as long as tibia, longer than segments 2 to 5 together, without obviously prolonged spines ; midtarsus with reduced comb, segment 1 about one-third longer than tibia and than segments 2 to 5 ; hindtarsus twice as long as the cell of the hindwing, first segment 1½ to 2 times the length of segments 2 to 5 together ; spurs very long, apical one of hindtibia at least

two-thirds of first tarsal segment ; pulvillus and paronychium present, the latter without ventral lobe. SC^2 and R^1 of hindwing on a rather long stalk.

♂. Clasper with patch of friction-scales ; no corresponding scales on inner side of the eighth tergite. Spurs longer than in ♀.

♀. Antenna somewhat grooved laterally, with distinctly prolonged seriate ciliae.

Early stages not known.

Hab. Africa.

Two species.

Distinguishable from *Meganoton* by the shorter hook of the antenna, the penultimate segment of which is shorter than high, the much shorter tongue, the longer and narrower second segment of the palpus, the proportionally longer first protarsal segment, and the absence of the ventral flaps of the paronychia ; from *Leucomonia* by the absence of long claw-like spines from the first protarsal segment, the much longer tarsi and shorter tongue.

Key to the species :

Forewing without black discal streaks between R^3 and M^1 . . . . . 18. *P. buchholzi.*

Forewing with black discal streaks between R^3 and M^1 . . . . . 19. *P. natalensis.*

18. Poliana buchholzi.

Sphinx bucholzi Plötz, *Stett. Ent. Zeit.* xli. p. 76. n. 285 (1880) (Benjongo).
**Protoparce laucheana* Drnce, *Ent. Mo. Mag.* xix. p. 18 (1882) (W. Afr. ;—coll. Drnce).
**Protoparce weiglei* Möschler, *Abh. Senk. Naturf. Ges.* xv. p. 70. n. 154. t. 1. f. 24 (1887) (Accra ;— coll. Standinger).
Meganoton buchholzi, Kirby, *Cat. Lep. Het.* i. p. 683. n. 20 (1892).
Phlegethontius laucheana, id., *l.c.* p. 688. n. 8 (1892).
Phlegethontius weiglei, id., *l.c.* n. 9 (1892).

♂ ♀. Both sexes have a prominent spine (not thorn or claw) at the end of the foretibia exteriorly, which is wanting in *natalensis*. First segment of hindtarsus about 1½ times as long as 2 to 5 together. The upperside of the forewing has nearly the aspect of that of pale specimens of *Protoparce rustica* ; the white stigma is conspicuous ; there are no longitudinal black streaks between R^3 and M^2 ; antemedian area white, especially behind ; a large median costal area centred by the stigma more or less olive or yellowish olive, this colour spreading distad to margin ; three dentate discal lines, the interspace between the second and third more or less white.

♂. Long apical spur of hindtibia almost equal in length to the first tarsal segment. Tenth tergite not divided, dilated just before the end, which curves ventrad and is pointed, widened part convex above, feebly carinate, the carina extending to the tip, underside prismatically carinate ; sternite nearly as long as the tergite in a side-view, narrowing to end, which is sinuate. Clasper almost of equal width from middle to end, apex rounded ; there is a long patch of narrow, non-dentate, pointed (lanceolate) friction-scales, all short except the middle ones, which are strongly prolonged and stand upright, forming a long and high crest, which is very conspicuous ; no friction-scales on the innerside of tergite 8 ; the inner surface of the clasper is deeply concave ventrally in middle. In this cavity

lies the harpe, which is comb-like, bearing at its upper edge several large pointed teeth, the apical tooth projecting from the cavity. Penis-sheath without external armature, but with a spiniferous flap inside.

♀. Eighth sternite long; vaginal orifice somewhat transverse, the edge somewhat raised, but without process.

Hab. West Africa, apparently very rare. Besides the three types of *buchholzi*= *lancheana*=*weiglei* there exists in collections, to our knowledge, the following specimen only: 1 ♀ Mus. Roy. Bruxelles, from Karrongo, Stanley Falls, Upper Congo.

19. Poliana natalensis.

**Dihudia natalensis* Butler, *Proc. Zool. Soc. Lond.* p. 13. n. 29 (1875) (Natal;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 616. n. 21. t. 94. f. 5 (1877).
Acherontia spei (!!) Butler, *Proc. Zool. Soc. Lond.* p. 13. sub n. 29 (1875).
Meganoton natalensis, Kirby, *Cat. Lep. Het.* i. p. 683. n. 21 (1892) (Natal).

♂♀. The species has somewhat the appearance of very pale individuals of *Psilogramma menephron*. There are two black streaks on the disc of the forewing between R^3 and M^2. The first segment of the hindtarsus is about twice as long as the four other segments together.

♂. Tenth abdominal tergite cleft to middle, the two halves close together, not separately movable as in *Psilogramma*, each half elongate, with parallel sides in a dorsal view, prismatically compressed, the underside convex, subcarinate, apex blunt in dorsal, sharp in lateral view; sternite broad, a little longer than broad, rounded at end. Clasper long, dorsal margin somewhat rounded, ventral margin shallowly sinuate; a narrow longitudinal stripe of friction-scales on the outer side, the scales large, broadly rounded at the end, not erect, dark wax-yellow with brown edges; harpe (Pl. XXXV. f. 18) with a single process, which is rather short, somewhat twisted, and truncate. Penis-sheath (Pl. XXVIII. f. 38) armed with a short, stout, conical tooth, which points sinistro-laterad.

♀ not dissected.

Hab. South and East Africa.

In the Tring Museum 1 ♂ from the Kikuyu Escarpment, British East Africa, January 1901 (W. Doherty); another from Natal.

The Kikuyu specimen is more variegated with brown than the southern individuals which we have seen.

Butler, *l.c.*, says: Our example bears a label by the collector bearing the following inscription: "*Acherontia spei* ♂. Only two ♀ specimens taken in 1857 (one of them lost). I have not observed that peculiar chirping noise; had they chirped I am sure I would have observed. Query, Does the ♂ only chirp, and the ♀ not?—*W. Grys.*" "I have not thought the MS. name applicable, and therefore have not used it."

The reader will have guessed, without being told, that *spec.*, and not *spei*, is written on the label. However, if Butler mistook *spec.* for a manuscript name *spei* which he did not think applicable, why did he publish it?

IX. LEUCOMONIA gen. nov.—Typus: *bethia*.

Diludia, Kirby (*non* Grote & Rob., 1865), *Trans. Ent. Soc. Lond.* p. 243 (1877).
Macrosila, Miskin (*non* Walker, 1856), *Proc. Roy. Soc. Queensld.* viii. p. 24 (1891).
Meganoton, id. (*non* Boisduval, 1875), *Cat. Lep. Het.* i. p. 682 (1892).

♂♀. Antenna (♀) subcylindrical, not impressed, ciliae not prolonged; hook (♂♀) *short*, penultimate segment (and preceding ones) shorter than high. Eye not lashed. Tibiae not spiny; foretibia and first segment of foretarsus rough with long scaling; spines of row 2 of first protarsal segment prolonged, apical spines of the other segments also somewhat prolonged; bristles of comb of midtarsus shorter than in *Meganoton*, the comb consisting also of fewer long bristles; basal spines of third row of first hindtarsal segment little longer than the more distal ones; hindtarsus *not much longer* than the cell of the hindwing; pulvillus and paronychium present, the latter without ventral flaps. D^2 of hindwing with a rather long spur proximally running out into the middle fold of the cell, which fold extends nearly to the base.

♂. Sexual armature similar to that of *Psilogramma*. Patch of friction-scales on clasper larger, comparatively shorter.

Early stages not known.

Hab. Australia.

One species.

20. Leucomonia bethia.

**Diludia bethia* Kirby, *Trans. Ent. Soc. Lond.* p. 243 (1877) (Rockhampton, ♀;—Mus. Dublin); Waterh., *Aid Identif. Ins.* ii. t. 140. f. 4 (♀) (1883).
Macrosila bethia, Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 26. n. 44 (1891) (Rockhampton).
Meganoton bethia Kirby, *Cat. Lep. Het.* i. p. 683. n. 19 (1892).
**Meganoton distinctum* Rothschild, Nov. Zool. i. p. 89. t. 7. f. 12 (1894) (N. Queensland;—Mus. Tring).

♂♀. Upperside of body and forewing and the whole underside almost uniformly white, forewing with a black, thin but prominent, oblique apical line which is almost straight. Hindwing blackish brown, grey-white in anal region.

♂. Tenth tergite deeply divided into two slender processes which lie close together; sternite (Pl. XL. f. 12) broad and short, sinuate, the lobes broad and rounded. No free harpe. Penis-sheath with a short process similar to that of *Psilogramma menephron*.

♀. Vaginal plate with a small mesial sinus apically, proximal part of plate much folded transversely, the folds irregular, mouth of vagina antemedian, the postvaginal part of the plate somewhat convex mesially, slightly concave and scaled laterally, with the rounded disto-lateral margins somewhat raised.

Hab. Queensland and West Australia; rather rare in collections.

In the Tring Museum 4 ♀♀ from: Queensland; Derby District, West Australia.

A ♂ and 2 ♀♀ in the Dublin Museum.

X. PSILOGRAMMA gen. nov.—Typus : *menephron*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* iii. p. 164 (1780) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 87 (1875).
Hyloicus Hübner, *Verz. bek. Schm.* p. 139 (1822) (partim).
Macrosila Walker, *List Lep. Ins. B. M.* viii. p. 208 (1856) (partim).
Anceryx id., *l.c.* p. 225 (1858) (partim) ; id., *l.c.* xxxi. p. 36 (1864).
Meganoton Boisduval, *l.c.* p. 58 (1875) (partim).
Diludia, Butler (*non* Grote & Rob., 1865), *Proc. Zool. Soc. Lond.* p. 13 (1875).
Pseudosphinx, Hampson (*non* Burmeister, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 169 (1892).

♂♀. Antenna shorter than in *Meganoton*, hook shorter, penultimate segment about as long as high, the preceding ones shorter than high. Palpus differing from that of *all* the other species of the present subfamily in the second segment having a *naked* stripe over the inner surface (as prolongation of the naked stripe of the first segment). Labrum very little raised in middle. First segment of foretarsus somewhat longer than segments 2 to 4 together ; comb of midtarsus well developed, that of hindtarsus as in *Meganoton* ; long spur of midtibia about $\frac{1}{2}$, the long apical one of hindtarsus nearly $\frac{2}{3}$, the length of the respective first tarsal segment. Pulvillus and paronychium present, the latter with *one* lobe on each side.

♂. Clasper with patch of modified scales, the scales large, rounded, entire, multistriate ; harpe vestigial (Pl. XXXV. f. 20), represented merely by a thickly scaled slight incrassation of the ventral margin of the clasper ; process of penis-sheath short, forked. No friction-scales on the inner surface of eighth tergite.

♀. Antenna subcylindrical, ciliae not prolonged.

Larva : thoracical tergites with small conical tubercles, arranged in transverse rows ; head minutely granulose all over, somewhat narrowing above ; horn and anal segment very rough with conical tubercles, horn curving upwards, ⌐-shaped ; dichromatic, one form green with white oblique stripes, the other with a broad brown dorsal band, constricted on each segment, beginning on the third thoracical segment, large lateral and ventral patches also brown.

Chrysalis with a long free tongue-case which is not recurved.

Hab. Oriental Region.—Only one species.

The genus is a development of *Meganoton*, being more specialised in the palpi and paronychium.

As will be seen from the above synonymy, the species has been treated under seven generic names. The reference to *Pseudosphinx*—proposed by Burmeister for a Sphingid belonging to another subfamily—is wild, to say the least.

21. Psilogramma menephron.

Sphinx menephron Cramer, *Pap. Ex.* iii. p. 164. t. 285. f. A (♀) (1780) (Amboina).
Hyloicus menephron, Hübner, *Verz. bek. Schm.* p. 139. n. 1485 (1822).
**Macrosila discistriga* Walker, *List Lep. Ins. B. M.* viii. p. 209. n. 17 (1856 ;—Brit. Mus.).
Anceryx pinastri var., id., *l.c.* viii. p. 225. sub. n. 1 (1856).
Meganoton discistriga, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 59. n. 2. (1875).
**Sphinx abietina* id., *l.c.* p. 108. n. 47 (1875 ;—coll. Charles Oberthür).
**Diludia vates* Butler, *Proc. Zool. Soc. Lond.* p. 13. (1875) (Ceylon ; Madras ;—Mus. Brit.).
Pseudosphinx discistriga, Hampson, in Blanf., *Fauna Brit. India, Moths* i. p. 105. n. 169 (1892) (partim).
Meganoton (?) menephron, Kirby, *Cat. Lep. Het.* i. p. 683. n. 13 (1892).

♂♀. Variable in colour and size geographically and individually ; in most localities there is a dark and a pale form. The various subspecies are not well-

defined. Cramer's figure is bad, the subapical white patch of the forewing is an exaggeration.

♂. Tenth tergite divided into two slender processes which lie close together, but are movable separately, they are curved (Pl. XXVI. f. 28. 29); sternite short and broad, the lobe broader than long, truncate-sinuate, the angles slightly produced, sides distally rounded-dilated. Patch of modified scales about three times as long as broad, deep brown except at edges (Pl. LVIII. f. 34). Process of penis-sheath (Pl. XXVIII. f. 31) very characteristic, sometimes distinctly asymmetrical. We have not noticed any difference in the sexual armature of ♂♂ from different localities. Head see Pl. LXI. f. 6. 7.

♀. Postvaginal portion of vaginal plate chitinised, smooth, scaled, halfmoon-shaped, somewhat truncate, the lateral margins elevated; vaginal cavity surrounded proximally and laterally by a wrinkled membranaceous ridge (Pl. XXII. f. 9).

Hab. Oriental Region: Ceylon to Japan, eastwards to New Caledonia.

Three subspecies:

a. P. menephron lifuense.

**Meganoton lifuense* Rothschild, Nov. Zool. i. p. 90. t. 7. f. 20 (1894) (Lifu;—Mus. Tring).

♂♀. The palest form, some specimens nearly all white on the thorax and forewing; the black discal streaks R^3—M^2 of the forewing thin, often partly or totally obsolete. The subspecies is variable; in the darker specimens the discal lines of the forewing are rather pronounced, and there is not distinct medio-costal brown area; in the paler individuals the markings, inclusive the proximal part of the apical black line, become indistinct.

Hab. Lifu, Loyalty Islands.

Fourteen specimens in the Tring Museum.

b. P. menephron menephron.

Sphinx menephron Cramer, *l.c.*; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 104. n. 195 (1888) (Amboina).
Hylobicus menephron, Hübner, *Verz. bek. Schm.* p. 139. n. 1485 (1822).
**Macrosila discistriga* Walker, *List Lep. Ins. B.M.* viii. p. 209. n. 17 (1856) (Silhet; Hongkong; N. China;—Mus. Brit.); Moore, in Horsf. & Moore, *Cat. Lep. Mus. E.I.C.* i. p. 268. n. 618 (1857); Walk., *l.c.* xxxi. p. 34 (1864) (Cambodia; Ceram); Moore, *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal).
**Macrosila casuarinae* Walker, *List. Lep. Ins. B.M.* viii. p. 210. n. 19 (1856) (Sydney; C. York;—Mus. Brit.); Misk., *Proc. Roy. Soc. Queensld.* viii. p. 24. n. 41 (1891) (Newcastle; Brisbane; Rockhampton; Cardwell; C. York; =*nebulosa*; on *Tecoma* and *Jasminum*).
Anceryx pinastri var. β, Walker, *l.c.* viii. p. 223. sub n. 1 (1856) (N. India).
Sphinx emarginata Moore, in Horsf. & Moore, *Cat. Lep. Mus. E.I.C.* i. p. 268. n. 618 (1857) (sub synon., nom. max. supervac.).
Macrosila darius Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 89. n. 1470 (1857) (Silhet; *nom nud.*); Boisd., *Spec. Gén. Lép. Hét.* i. p. 59. n. 2 (1875) (sub synon.).
Macrosila (?) *discistriga*, Semper, *Verh. Zool. Bot. Ges. Wien.* xvii. p. 699. n. 8. (1867) (Bohol, larva).
Meganoton discistriga, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 59. n. 2 (1875); Pagenst., *Jahrb. Nass. Ver. Nat.* xliv. p. 104. n. 193 (1888) (Amboina); Kirby, *Cat. Lep. Het.* i. p. 682. n. 7 (1892) (E. Indies); Huwe, *Berl. Ent. Zeitsch.* xl. p. 367. n. 39 (1895) (Java).
**Sphinx obietina* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 108. n. 47 (1875) (Himalaya;—coll. Oberthür); Snell., *Tijdschr. Ent.* xx. p. 2. n. 12 (1877) (Java); id., *l.c.* xxii. p. 64. n. 6 (1879) (S. Celebes); Pagenst., *Iris* iii. p. 2. n. 1 (1890) (Palawan).
Sphinx casuarinae, Boisduval, *l.c.* p. 109. n. 49 (1875).

**Diludia rates* Butler, *Proc. Zool. Soc. Lond.* p. 13. n. 28 (1875) (Ceylon ; Madras ;—Mus. Brit.) ; Moore, *Lep. Ceylon* ii. p. 3. t. 74. f. 1.1*a* (1882) ; Swinh., *Proc. Zool. Soc.* p. 289. n. 21 (1885) (Poona ; Bombay, viii.-x.) ; id., *Trans. Ent. Soc. Lond.* p. 165. n. 23 (1890 (Moulmein) ; Hamps., *Illustr. Typ. Spec. Lep. Het. B.M.* viii. p. 2. n. 32 (1891) (Nilgiris) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 34. n. 135 (1892) (Bengal).

Diludia casuarinae, Butler, *Trans. Zool. Soc. Lond.* ix. p. 615. n. 14 (1877) (Sydney) ; Swinh., *l.c.* i. p. 34. n. 134 (1892) (N. S. Wales ; Moreton Bay).

**Diludia nebulosa* Butler, *l.c.* ix. p. 615. n. 15 (1877) (Cape York ;—Mus. Brit.) ; Druce, *Proc. Zool. Soc. Lond.* p. 571. n. 2 (1888) (Aola, Guadalcanar).

Diludia discistriga, Butler, *l.c.* ix. p. 615, n. 16 (1877) (Hongkong ; N. China ; Java ; Masuri ; Bombay) ; id., *Illustr. Typ. Specim. Lep. Het. B.M.* iii. p. 3. t. 41. f. 6 (1879); Moore, *Lep. Ceylon* ii. p. 3. t. 73. f. 1. 1*a*. 1*b* (*l.*, *p.*, *l.*) (1882) ; Pagenst., *Iris* i. p. 41. n. 1 (1885) (Ceram) ; Hamps., *Illustr. Typ. Specim. Lep. Het. B.M.* viii. p. 2. n. 31 (1891) (Nilgiris, 3000 ft.) ; Swinh., *l.c.* i. p. 33. n. 130 (1892) (China ; Ganjam ; Silhet ; Burmah).

**Diludia melanomera* Butler, *Trans. Zool. Soc. Lond.* ix. p. 615. n. 17. t. 94. p. 4 (1877) (Silhet ;—Mus. Brit.) ; Swinh., *l.c.* i. p. 33. n. 129 (1892) (Berhampore ; Silhet : Singapore).

**Diludia macromera* Butler, *Ann. Mag. N.H.* (5). x. p. 435. n. 7 (1882) (Sarawak ;—Mus. Brit.) ; Swinh., *l.c.* i. p. 33. n. 132 (1892) (Ceylon).

Sphinx ahrendti Pagenstecher, *Jahrb. Nass. Ver. Nat.* xli. p. 104. n. 196 (1888) (Amboina ; *nom. nud.* "Plötz" in litt.).

Pseudosphinx discistriga, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 105. n. 169 (1892) (partim) ; id., *Illustr. Typ. Spec. Lep. Het. B.M.* ix. p. 3. n. 52 (1893) (partim ; Ceylon) ; Semp., *Schm. Philipp.* ii. p. 404. n. 52. t. 11. f. 5. 6. 7 (*l.*, *p.*) (1896) (Luzon ; Bohol ; Cebu ; Mindanao ; v.-x., xii.-iii.) ; Leech, *Trans. Ent. Soc. Lond.* p. 288. n. 67 (1898) (Ichang, viii.) ; Pagenst., in Chun, *Zoologica* xii. 29. p. 17. n. 17 (1900) (partim ; Kinigunang ; specim. ex Ralum = *Megacorma obliqua*).

Diludia increta, Swinhoe, *l.c.* i. p. 33. n. 133 (1892) (Assam).

Meganoton melanomera, Kirby, *Cat. Lep. Het.* i. p. 682. n. 8 (1892) (Silhet).

Meganoton rates, id., *l.c.* p. 683. n. 11 (1892 (India ; Ceylon).

Meganoton rates var. *a.*, *Sph. abietina*, id., *l.c.* sub n. 11 (1892) (Himalaya).

Meganoton (?) *menephron*, id., *l.c.* n. 12 (1892) (Amboina).

Meganoton macromera, id., *l.c.* n. 14 (1892) (Sarawak).

Meganoton casuarinae, id., *l.c.* n. 15 (1892) (Australia).

Meganoton nebulosa, id., *l.c.* n. 16 (1892) (Australia).

♂♀. A very variable form as regards size and colour. The individual variability of this insect was not recognised by Butler, who bestowed no less than four names upon the differently coloured specimens, though the insect had already six names given to it. Besides these ten names (*menephron*, *discistriga*, *casuarinae*, *emarginata*, *darius*, *abictina*, *rates*, *nebulosa*, *melanomera*, *macromera*) there are two more, *increta* and *ahrendti*, under which it has been referred to. An ample supply !

On the other hand, Sir George Hampson, knowing that *menephron*, or *discistriga* as he calls the species, showed a great amount of variability, considered nearly all the oriental Sphingids which have grey forewings marked with black as being individuals of one and the same species. Thus we find knocked together in *Fauna Brit. India*, *Moths* I. and IV., under the name of *discistriga* no less than *five species* belonging to *four genera* and to two tribes.

There are three principal types of aberrations : (*a*) a pale form (*f. rates*) ; (*b*) a pale form with conspicuous black medio-costal area on the forewing (*f. casuarinae*) ; and (*c*) a dark form (*f. menephron*).

The *f. casuarinae* seems to be confined to Australia and New Guinea, where the brown form is very rare.

The mesonotum has sometimes two black dots ; the foretarsal segments 2 to 5 are often dark brown. Very large specimens occur in the Bismarck Archipelago.

Larva and pupa see above.

Hab. China to Ceylon, eastwards to the Solomon Islands, more or less common.

In the Tring Museum 180-odd specimens from a great number of localities · one caterpillar.

c. *P. menephron increta.*

**Ancerya increta* Walker, *l.c.* xxxi. p. 36 (1864) (Shanghai ;—Brit. Mus.) ; Leech, *Proc. Zool. Soc.* p. 589. n. 33 (1888) (Japan).

Diludia increta, Butler, *Trans. Zool. Soc. Lond.* ix. p. 615. n. 19 (1877) (Shanghai ; *nec* Masuri & S. India) ; id., *Illustr. Typ. Spec. Lep. Het. B.M.* iii. p. 4. t. 41. f. 7 (1879) ; Leech, *Trans. Ent. Soc. Lond.* p. 120. n. 98 (1889) (Kiukiang).

Pseudosphinx discistriga, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 105. n. 169 (1892) (partim).

Pseudosphinx increta, Leech, *Trans. Ent. Soc. Lond.* p. 288. n. 65 (1898) (Japan ; Kiukiang ; Ichang ; Omei-shan).

Meganoton increta, Kirby, *Cat. Lep. Het.* i. p. 682. n. 10 (1892) (China ; Japan).

Sphinx increta, Bartel, in Rühl, *Grossschm.* ii. p. 51 (1899).

♂♀. A pale form, not always distinguishable from the pale individuals of *m. menephron*. The forewing of a uniform grey colour, with the transverse lines more or less obliterated ; the black oblique bar at the end of the cell, the apical half-wing, the costal markings midway between the two—the costal part of the discal lines—and the two discal streaks very prominent on the pale ground. In two of our specimens, without further indication of locality than Japan, those black markings are much enlarged, the two discal streaks being only separated by the vein, and the costal and apical markings being twice as heavy as in ordinary individuals.

Hab. Japan ; Corea ; China.

No dark form known from Japan, while in China *increta* merges into *menephron*. Common in Central and South Japan, not known from Yesso ?

In the Tring Museum 80-odd specimens ; 4 caterpillars.

XI. PEMBA gen. nov.—Typus : *distanti*.

♂. Tongue rather short, shorter than in *Psilogramma*. Pilifer with bristles. Palpus very slender, elongate, just visible from above, not dilated distally. Antenna shorter than cell of forewing. Foretibia armed with some long spines externo-laterally at and before end ; midtibia with very few spines near the spurs ; spurs long, long terminal one of hindtibia nearly as long as the first tarsal segment ; first segment of foretarsus shorter than tibia, not quite the length of segments 2 to 4 together, with three external prominent spines ; no midtarsal comb ; pulvillus present, paronychium with one slender lobe at each side. SC^2 and R^1 of hindwing on a stalk, R^2 near lower angle of cell, D^2 very long, very oblique, slightly angled, D^3 shorter than D^4.

Tenth tergite deeply divided. Harpe vestigial. No friction-patch. Penis-sheath with a short bilobate process as in *Psilogramma*.

♀ and early stages not known.

Hab. Pemba I., East Africa.

One species.

Distinguished from *Psilogramma*, which it resembles most in the sexual armature, by the fore- and midtibia bearing some spines, in the absence of a

midtarsal comb, the slender palpus, etc. From *Praedora* it differs, besides the sexual armature, in the long spurs and the long cross-vein D^2 of the hindwing. The genus connects *Praedora* and *Hoplistopus* with *Psilogramma*, but does not show a trace of the peculiar naked stripe of the last, which is a specialisation not acquired by the common ancestor.

22. **Pemba distanti** spec. nov.

♂. Whitish grey ; a lateral spot on metanotum, a series of dorso-lateral spots at the apices of the abdominal segments, and a mesial line on the abdomen black.

Wings, *upperside*.——Forewing whitish grey like thorax ; an indistinct costal spot at basal third, another in front of upper angle of cell, two very thin discal streaks R^3—M^2, an oblique thin line from tip of SC^1 towards disc, and the fringe-dots at the end of the veins brownish black, a trace of a discal band beginning at costal margin before fork, convex down to M^1, then straight, another band parallel with this and proximal of it, beginning at the costal spot, interrupted between R^1 and M^1.——Hindwing unicolorous, very thin brown fringe-spots at the ends of the veins.

Underside grey, no markings excepting a short apical oblique line on forewing and the small fringe dots.

Tenth tergite (Pl. XXVII. f. 1. 2) divided as in *Psilogramma menephron*, but the two processes wider apart and more strongly curved downwards ; sternite (Pl. XXVII. f. 3) very short, with a small round lobe at each side, mesially curved upwards, ⌣⌣-shaped in an apical view. Clasper (Pl. XXXV. f. 25) long sole-shaped, the inner sheath, just above the triangular ventro-basal part which represents the harpe, raised into a low sharp ridge (*r*). Penis-fnnnel (P–F) a short half-cylinder, open above, the ventral edge curved downwards ; penis-sheath (Pl. XXVIII. f. 32) with a two-pointed short process which projects laterad.

Length of forewing : 34 mm.

Hab. Pemba Island, East Africa ; 1 ♂ in coll. W. L. Distant.

XII. DOVANIA gen. nov.—Typus : *poecila*.

♂. Pilifer normal. Tongue well developed (length ?). Eye lashed. Palpus roughly scaled like body and legs, obtuse. Antenna very strongly compressed, setiform, hook long and quite gradnal ; segments ventrally not quite touching one another (side-view). Spines of abdomen numerous and small. Tibiae *not* spinose ; spurs *long*, almost *equal* in length, long terminal one of hindtibia about one-fourth shorter than the first tarsal segment ; first segment of foretarsus short, little longer than second, with three stout external spines besides a smaller basal one ; midtarsus without comb ; pulvillus absent ; paronychium with one lobe on each side. Wings entire ; cross-veins of hindwing strongly oblique, D^2 twice as long as D^3, this shorter than D^4 ; SC^2 and R^1 on a stalk.

Tenth tergite simple, narrow, sharply pointed ; sternite much broader, shorter, truncate, with the angles rounded (Pl. LIX. f. 4). Clasper reduced, without friction-scales ; harpe broad, concave, roundedly dilated dorsad at end ; inner surface smooth,

dorsal and apical edges denticulate (Pl. LIX. f. 3). Penis-sheath somewhat curved, with a short conical horizontal apical tooth pointing dextro-laterad (Pl. LIX. f. 9).

♀ and early stages not known.

Hab. British Central Africa.

One species.

23. **Dovania poecila** spec. nov. (Pl. VI. f. 9, ♂).

♂. Black, with few white hair-scales. Antenna (except scaling) hazel colour. Abdomen with broad creamy buff rings, which are broadly interrupted above, widest laterally, and confined to the tergites.

Wings, *upperside*.——Forewing olive-black, with the black lines indistinct, traceable in consequence of the presence of bluish white scales in the interspaces; an area at lower angle of cell and extending on to disc without these scales; a triangular costal apical patch deeper black and continued backwards as a kind of submarginal band; an angle-shaped apical spot followed behind SC^5 by a line, white; stigma ferruginous yellow; fringe with traces of white spots.——Hindwing ferruginous, base and abdominal margin black; fringe brown, with small white spots.

Underside: brown, both wings ferruginous on disc; this colour extending to distal margin except in front and behind; the two white markings near tip of forewing as above; hindwing with a bluish white postdiscal band, which is not well defined, and traces of some discal bands; there are also some bluish white scaling on the forewing in outer third.

Length of forewing: ♂, 36 mm.

Hab. District of Dowa, or Chiwere, Central Angoniland.

1 ♂ in the Oxford Museum.

XIII. LOMOCYMA gen. nov.—Typus: *oegrapha*.

Sphinx, Mabille (*non* Linné, 1758), *C. R. Soc. Ent. Belg.* xxviii. p. 187 (1884).

♂♀. Antenna (♂) strongly compressed, the fasciculated ciliae long, ventral series not reaching mesial line, ultimate segment shorter than in *Psilogramma*, *Meganoton* and allied genera, the preceding ones all shorter than high. Eye lashed. Tibiae not spiny. First segment of foretarsus long-scaled, appearing incrassate, externally with 3 or 4 moderately prolonged and somewhat curved spines, externo-apical spine of second segment also prolonged; first segment of mid- and hindtarsus much longer than the other segments together, and longer than the tibiae. Midtarsus *with* comb as in *Meganoton*; spines of row 3 of first segment of hindtarsus little prolonged basally, row 2 almost reaching base; spurs long, long apical one of hindtarsus about ¾ the length of first tarsal segment; pulvillus and paronychium present, the latter with *two* flaps at each side. Distal margin of wings scalloped, fringe long.

♂. Clasper without patch of modified scales; penis-sheath without armature.

♀. Postvaginal part of vaginal plate chitinised, broadly rounded apically; mouth of vagina proximal, a thin membranaceous fold runs from side to side bordering the vaginal cavity proximally, antevaginal part of vaginal plate membranaceous.

Larva and chrysalis unknown.

Hab. Madagascar.

One species.

24. Lomocyma oegrapha.

Sphinx oegrapha Mabille, *l.c.* (1884) (Madag.).
Hyloicus (?) *oegrapha*, Kirby, *Cat. Lep. Het.* i. p. 694. n. 16 (1892) (Madag.).

♂ ♀. The species bears a superficial resemblance to certain American *Dilophonota*.

♂. Tenth abdominal tergite produced into a long, strongly curved, obtusely pointed, subcylindrical process; sternite very short, the lobe shorter than broad, truncate, angles very strongly rounded, distal margin mesially continuous with the under surface of the anal cone, sides somewhat turned upwards. Clasper small, sole-shaped, dorso-apical margin turned inwards, rough with long scaling; subdorsal fold high basally, ending abruptly; harpe produced into a single, long, slender, pointed, process, curved upwards, bearing a minute tooth on the distal side. Penis-sheath dorsally produced into a very short rounded lobe, directed distad; no tooth or hook.

Hab. Madagascar; apparently rare.

In the Tring Museum 1 ♂, 1 ♀ from Madagascar, without more precise locality.

XIV. OLIGOGRAPHA gen. nov.—Typus: *juniperi*.

Sphinx, Boisduval (*non* Linné, 1758), in Deleg., *Voy. Afr. Austr.* ii. p. 595 (1847).
Anceryx Walker, *List Lep. Ins. B.M.* viii. p. 229 (1856) (partim).
Hyloicus, Butler (*non* Hübner, 1822), *Trans. Zool. Soc. Lond.* ix. p. 617 (1877).

♂ ♀. Antenna thickest beyond middle, almost clubbed in ♀; end-segment *not* more than two and a half times as long as high, not produced into a bristle-like process, dorsally covered with long scales; no prolonged fasciculated ciliae in ♀, those of ♂ about half as long as the segment is broad dorsally. Tongue longer than the body. Pilifer normal, genal process triangular, as long as pilifer. Palpus somewhat prominent, visible from above. Eyes *lashed*. Tibiae *not* spinose; first segment of foretarsus rather densely spinose externally, spines of first row a little longer than the others; midtarsus *with* comb, but the bristles of the comb not much longer than the ordinary spines; first segment of hindtarsus longer than segments 2 to 5 together, a little shorter than the tibia; spurs long, long apical one of hindtibia about $\frac{2}{3}$ to $\frac{3}{4}$ the length of the first tarsal segment; pulvillus *present*, paronychium with *one* lobe on each side.

Larva and chrysalis not known.

Hab. S. E. Africa.

The end-segment of the antenna is comparatively very short, reminding one of the antennae of *Dolbina* and allies.—A derivation from *Lomocyma*.

25. Oligographa juniperi.

**Sphinx juniperi* Boisduval, *l.c.* p. 595. n. 112 (1847) (Natal); id., *Spec. Gén. Lép. Hét.* i. p. 107. n. 40 (1875) (Natal; Hottentot country).
Sphinx juniperae (!), Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 89. n. 1475 (1857) (loc. err. !).

Aucoryx juniperi, Walker, *l.c.* viii. p. 229. n. 12 (1856) (Natal).
Hyloicus juniperi, Butler, *l.c.* ix. p. 617. n. 9 (1877) (Natal); Kirby, *Cat. Lep. Het.* i. p. 694. n. 15 (1892) (Natal).

♂. Tenth abdominal tergite gradually narrowed, slightly curved, pointed, compressed, highest beyond middle, clothed with numerous short hairs, dorsally sulcate and bicarinate, below carinate; sternite elongate, slightly narrowed to end, somewhat convex below, straight, curved upwards at extremity, sinuate, the angles strongly rounded. Clasper without friction-scales, sole-shaped; harpe (Pl. XXXV. f. 16) with a single obtuse and somewhat concave process, which bears a tooth on the external surface, upper edge of harpe dilated and dentate. Penis-sheath with a very long denticulate process, curved proximad (Pl. XXVIII. f. 37).

♀. Vaginal cavity subapical (Pl. XX. f. 23), large, transverse, the antevaginal portion of the plate convex, the proximal edge of the cavity gently sinuate, eighth sternite very short.

Hab. Natal.

In the Tring Museum 21 ♂♂, 7 ♀♀ from: Namaqualand; Bashee R., Caffraria; Natal; Delagoa Bay.

XV. HOPLISTOPUS gen. nov.—Typus: *penricei*.

♂. Tongue about half the length of the body. Pilifer with bristles and a very few *scales*; genal process triangular, nearly reaching end of pilifer. Palpus slender, visible from above, first segment with rough hairs. Antenna as long as cell of forewing, not strongly compressed, not higher than broad, distinctly incrassate distally, hook short, fasciculated ciliae of basal row of segments very short mesially, distal rows reaching about half way down to the mesial line. Scaling between antennae prolonged to a crest. Tibiae *not* spinose, longer than the respective first tarsal segment; first segment of foretarsus about twice as long as broad, armed with three stout spines, the apical one nearly as long as the segment, curved, second and third segments about equal in length, apical spines also prominent; midtarsus *without* comb; first segment of hindtarsus about as long as the four others together; long distal spur of hindtibia about one-third the first tarsal segment, the two pairs rather far apart; pulvillus and paronychium *present*, the latter with one lobe; abdominal spines very weak, none on sternites.

♂. Tenth abdominal segment strongly compressed, almost vertical at the sides, narrow, curved, obtusely pointed, dilated ventrad, so that it appears truncate in side-view (Pl. XXVII. f. 9, 10); the sternite produced into a very long process, which is deeply divided into two long, slender, pointed lobes, which remind one of the tenth sternite of *H. ligustri*. Clasper rounded sole-shaped; harpe (Pl. XXXV. f. 21) very short, dilated dorsad into a dentate lobe. Penis-sheath without armature.

♀. Unknown.

Larva and chrysalis unknown.

Hab. South-West and South Africa.

Two species.*

* Two more African genera of this group see Appendix.

26. **Hoplistopus penricei** spec. nov. (Pl. XII. f. 5, ♂).

♂. Body and wings smoky grey above and below, very uniform in colour. Scaling of antenna greyish white. Abdomen with two rows of black patches laterally, the patches not very distinct.

Wings, *above*.— Forewing : on disc a series of very thin black streaks between veins, the series ending in the oblique apical line, similar but shorter streaks upon the veins at end ; there is a faint indication of discal and postdiscal transverse lines not far from inner angle, and also an indication of a grey submarginal band ; fringe paler between veins, the nerve-dots ill-defined.——Hindwing unicolorous, fringe white, with minute smoky grey dots.

Underside without markings, long hairs of cell of forewing paler grey, nerve spots of fringe better defined than above.

Length of forewing : 24 mm.

Hab. Munyendi River, Angola, April 1900 (Penrice), 1 ♂ in Mus. Tring.

A second ♂, with scarcely any markings, in Mus. Stockholm from Damaraland.

27. **Hoplistopus butti** spec. nov. (Pl. V. f.15, ♂).

♂. Structurally the same as *penricei*, the two insects being perhaps only cospecific subspecies. Body and wings whitish grey, far paler than in *penricei* ; mesothoracic tegula with black upper edge ; abdomen with one series of black spots, which is dorso-lateral, or there is a second row of spots below the first.

Forewing *above* : a line in cell and one or more lines on discs between the veins black ; an oblique black apical stripe ; two parallel lines on disc, S-shaped, feebly marked, followed distally before inner margin by a linear patch representing a third line.

Hab. Beaufort West, Cape Colony.

3 ♂♂, all imperfect, in the Tring Museum, collected by Mrs. Butt.

XVI. PRAEDORA gen. nov.—Typus : *marshalli*.

♂. Differs from *Hoplistopus* in the following points :—

Palpus rather more prominent ; fore- and midtibia *spinose* ; foretibia with some long blunt apical spines, terminal spine more than a third the length of the tibia ; first segment of foretarsus as long as 2 to 4 together ; spurs spinose ; long terminal one of hindtibia a little longer than half the first tarsal segment.

♂. Tenth abdominal tergite very strongly compressed, carinate above, vertical at the sides, curved, pointed, evenly narrowed ; lobe of sternite rounded-triangular, very obtuse, nearly as long as tergite ; clasper narrow, sole-shaped, long-scaled outside, dorsal margin curved inward mesially, subdorsal fold of inner surface high, inner surface beset with small tubercles ventrally and distally ; harpe (Pl. XXXV. f. 19) ending in a gradually narrowed ventro-distal process, which is curved inward and upward distally. Penis-sheath without armature.

♀. Antenna sub-andromorphic, with long seriated ciliae. Vaginal plate (Pl. XXI. f. 12) sinuate, the edge rugate.

Larva and chrysalis unknown.

Hab. East Africa.

Two species.

28. **Praedora marshalli** spec. nov. (Pl. V. f. 16, ♂).

♂. Body *above* brownish grey, collar with an almost white thin transverse line, sides of mesothoracic tegula brownish black ; abdomen with a series of small mesial dots and a lateral longitudinal band which are brownish black, two widely separate rows of dorsal dots whitish and not strongly marked ; underside grey, palpus brown at side.

Wings, *above*.——Forewing : grey, some antemedian lines undulating, curving costad, two distal lines, the external one more distinct, S-shaped, a postdiscal, more or less zigzag, line, more distinct in front, some submarginal angle-shaped spots, pointing distad, more or less jointed to the post-discal line, and a distinct lunule SC^5—R^1, all brownish black ; stigma white, edged with black ; fringe brown, with heavy whitish grey spots.——Hindwing : pale greyish brown, darker distally, fringe as on forewing.

Underside brownish grey, both wings with traces of two discal lines.

Length of forewing : ♂, 20 mm.

Hab. South-East Africa.

In the Tring Museum 1 ♂ from Umtali, Mashonaland (G. A. K. Marshall), received from the British Museum, where there are several specimens from the same place, as well as 2 ♂♂ from N'Gami (F. D. Lugard).

29. **Praedora plagiata** spec. nov. (Pl. XII. f. 9, ♀).

♀. Pilifer without scales, only with bristles. Foretibia shorter than first dorsal segment, with two apical spines, one dorsal, long, curved, the other externo-lateral, shorter, besides a few short spines concealed under the rather rough scaling (midtarsus and hindleg not preserved). Antenna short, slender (tip broken). SC^2 and R^1 of hindwing from a point, not stalked ; head tufted ; occiput and upperside of thorax blackish brown, edge of pronotum and middle of mesonotum greyish white ; abdominal tergites wood-brown, paler at the edges, with vestiges of three rows of brown spots or interrupted bands, one row dorsal, the other lateral ; underside clayish grey, without black patches.

Wings in tint similar to the body. *Upperside*.——Forewing : grey, with a faint pinkish tone ; a large brownish black middle patch, narrowing behind, extending from base of M^1 well upon disc, widest at costal margin, where it becomes paler in middle, continued to inner margin by two discal lines ; antemedian and subbasal brown lines ill-defined, three in number, the second and third heavier marked at the costal margin ; beyond the patch there is an indistinct discal line bordered with buff distally, a still more indistinct, zigzag, postdiscal line, some geminate vein-dots, indicating the submarginal line, and an obliquely longitudinal dash ending at the tip of SC^5, where it is preceded by a small black angle-shaped mark ; fringe chequered brown and white.——Hindwing greyish brown, palest at base, without markings ; fringe white with brown dots.

Underside : cinnamon bistre brown, base a little paler, disc of both wings crossed by three *very* indistinct parallel lines.

Vaginal plate (Pl. XXI. f. 12) sinuate, the edge produced into a broad rounded lobe at each side ; subcarinate mesially, obliquely wrinkled proximally, the wrinkles occupying a triangular mesial space.

Length of forewing : ♀, 29 mm.

Early stages unknown.

Hab. Region of M'Pala, Tanganyika (Guillemé), 1 ♀ in coll. Charles Oberthür.

30. **Praedora leucophaea** spec. nov. (Pl. LXVI. f. 10, ♂).

♂. Pulvillus narrow; lobe of paronychium very slender, short. Body greyish white, with some clayish scales here and there; abdomen appearing ringed with clay-colour owing to grease.

Wings, *upperside*.——Forewing greyish white; costal margin slightly concave as in preceding; markings clay-colour; an antemedian band of two lines, curved costad in front; between it and base traces of three lines, indicated at costal margin by three spots; a trace of a white stigma just outside antemedian band; a broader discal band, proximally convex and distally concave between veins, consisting of two lines with the interspace filled in; between this band and outer margin a double line, the inner one vestigial, slightly accentuated by vein-dots; the outer one distinct, consisting of half-moons which are convex distally; a submarginal line of vein-dots; fringe clay-colour, with small greyish white internervular spots.——Hindwing pale clay-colour, with a vestige of deeper coloured submarginal band, which becomes a little more distinct in a side-view.

Underside grey, shaded with clay-colour, distal margins more greyish white.——Forewing with three faint parallel discal lines, evenly curved, not dentate, distances between lower angle of cell, first line, third line, and distal margin about the same.——Hindwing also with three lines, the first just in front of apex of cell, abbreviated, the second about 1½ mm. outside lower angle of cell, the third at R^3 a little nearer cell than distal margin.

Length of forewing: ♂, 20 mm.

Hab. Luitpold Mountains, near Ikutha, Brit. E. Africa.

One ♂ in the Tring Museum, received from Messrs. Standinger & Bang-Haas.

XVII. COCYTIUS.—Typus: *antaeus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Ex.* i. p. 124 (1775).
Cocytius Hübner, *Verz. bek. Schm.* p. 140 (1822) (type: *antaeus*).
Phlegethontius id., *l.c.* (type: *cluentius*).
Amphonyx Poey, *Cent. Lep.* t. 4 (1832) (type: *duponchel*).
Macrosila Walker, *List. Lep. Ins. B.M.* viii. p. 200 (1856) (partim).
Amphionyx (!), Lucas, in Sagra, *Hist. Cuba* vii. p. 289 (1856).
Anemistrognathus Wallengren, *Öfv. Sv. Vet. Ac. Handl.* xv. p. 138 (1858) (type: *antaeus*).

♂♀. Differs from *Protoparce* and *Amphimoea* in the third segment of the palpus being prolonged into a pointed, conical, naked horn. Paronychium with *two* lobes on each side. The third row of spines on all or only on the distal segments of the foretarsus of the ♂ developed into a comb. Antennal segments of ♀ without basal rows of prolonged ciliae.

Spines of abdominal tergites heavy, conical, those of the 7th resp. 8th segment long; no spines or only vestiges of such on the sternites. Mesonotum as a rule with two white dots, mostly covered by the upper edges of the mesothoracic tegula. The scales in the middle of the abdominal tergites raised into more or less conspicuous tufts or crests. The first segment of the foretarsus with numerous short spines at the outerside; in the ♂ the 3rd row dense on segments 1 to 5, or 2 to 5, or 3 to 5, and the spines directed laterad, and somewhat curved, forming a peculiar kind of comb (Pl. LXIV. f. 6. 9. 10); the spines of rows 1, 2 and 4 of segments 2 to 5, and of rows 2 and 4 of segment 1 few in number,

the apical spines often alone representing these rows, *C. duponchel* being the most advanced species in the development of this tarsal armature; in the ♀ the spination more normal, the spines of row 3 not or less obviously directed laterad, and rows 1, 2, and 4 always present, though the number of spines is generally smaller than in row 3, segment 1 excepted.

The transparent spaces on the disc of the hindwing are the result of the obliteration of the lower layer of scales and of the modification into hair-scales of the scales of the upper layer; this development is vestigial in *cluentius* and *beelzebuth*, which do not possess the large transparent spaces; a similar development is observable on the forewing, where the scales in the proximal half or two-thirds of cellules R^3—M^2 are half erect in several species and, especially on the under surface, reduced in size.

Larva: clothed with fine hairs; head narrowing above, subtriangular: horn granulose, curving downward; one or more white side-bands.—Food: *Anonaceae*.

Pupa: tongue-case free, either spirally recurved (*cluentius*), or not recurved with the end resting against the breast, prominently ringed; metanotum with two patches of rough tubercles, abdominal segments 2 to 8, or 2 to 7 with a long, transverse, basal patch of the same rough structure; a short tuberculated ridge behind the first stigma at the anterior edge of the mesonotum, cremaster acuminated, ending in two points.

Hab. Tropical and subtropical America, occasionally farther north as a straggler.

Five species.

The genus contains the largest Sphingids. Its species have the longest tongue, measuring in large *cluentius* about 25 mm. (Smith, in *Trans. Amer. Ent. Soc.* xv. p. 152 (1888) curiously states that the tongue SLIGHTLY exceeds the tip of the abdomen in length).

Key to the species:

a. Hindwing without transparent discal interspaces	*b*.	
Hindwing with transparent discal interspaces	*c*.	
b. Abdomen with five yellow spots	31.	*C. cluentius*.
Abdomen with three yellow spots	32.	*C. beelzebuth*.
c. Transparent spaces distally indented between the veins	34.	*C. antaeus*.
Transparent spaces not indented between the veins	*d*.	
d. Postdiscal line of forewing crossing SC^4 nearer apex of wing than upper angle of cell; forewing of ♀ with white apical patch and other white markings, ♂ more uniform in colour, black streaks R^3—M^2 not very prominent on account of the dark ground colour of the wing	33.	*C. duponchel*.
Postdiscal line crossing SC^4 midway between apex of wing and upper angle of cell, or nearer cell; forewing similar in the sexes, paler than in *antaeus*, discal streaks R^3—M^2 prominent; no obvious white markings, besides stigma	35.	*C. lucifer*.

Pupa known of three species :

a. Tongue-case spirally rolled up . . . . *C. cluentius.*
Tongue-case not spirally rolled up . . . . *b.*

b. Abdomen without patch of tubercles upon segment 8 . . . . . *C. duponchel.*
Abdomen with a rough patch of tubercles upon the 8th segment . . . . . *C. antaeus.*

31. Cocytius cluentius.

Merian, *Ins. Surinam.* t. 3 (1705) (larva, pupa).

Sphinx cluentius Cramer, *Pap. Ex.* i. p. 124. t. 78. f. B (1775) (Ind. occ.) ; id., *l.c.* ii. p. 43. t. 126. f. A (1777) (Surinam) ; Goeze, *Ent. Beytr.* iii. 1. p. 219. n. 53 (1779).

Phlegethontius cluentius, Hübner, *Verz. bek. Schm.* p. 140. n. 1500 (1822).

Amphonyx cluentius, Pocy, *Cent. Lep.* p. 4 (1832) ; Méuétr., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 90. n. 1488 (1857) (Haiti) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 67 (1865) ; id., *l.c.* vi. p. 329 (1866) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 62. n. 1 (1875) (Cayenne ; Antilles : *cit. falsa*) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 345 (1876) (Surinam) ; Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 630. n. 6 (1877) (Brazil : R. Janeiro ; Haiti) ; Burm., *Descr. Rép. Arg.* v. p. 316 (1878) (partim ; caterp. that of *P. albiplaga*) ; Butl., *Proc. Zool. Soc. Lond.* p. 483. n. 56 (1878) (Jamaica) ; Gundl., *Contr. Ent. Cubana* p. 205 (1881) (Cuba) ; Druce, *Biolog. Centr. Amer., Lep. Het.* i. p. 18. n. 4 (1881) (Chiriqui) ; Edw., *Papilio* iv. p. 12 (1884) (Vera Cruz) ; Pitt. & Bioll., *Lep. Het. Costa Rica* p. 11 (1897).

Macrosila cluentius, Walker, *List Lep. Ins. B. M.* viii. p. 200. n. 3 (1856) (Brazil ; Rio de Janeiro ; St. Domingo ; Surinam) ; Herr.-Sch., *Corresp. Bl.* p. 59 (1865) (Cuba).

Cocytius cluentius, Kirby, *Cat. Lep. Het.* i. p. 687. n. 10 (1892) (S. Amer. ; Antilles) ; Rothsch., Nov. Zool. i. p. 541 (1894) (Aroa) ; Bönninghausen, *Iris* xii. p. 114. n. 13 (1899) (Rio de Janeiro).

♂ ♀. The pattern of the forewing reminds one of *Dilophonota* ; cellules R^3—M^2 almost normally scaled, the multidentate scales being dense also near cell ; the disc of the hindwing has no transparent spaces, the modification of the scales to hairs not being completed on either side ; the scales of the upperside much narrower than those of the underside. Legs slenderer than in the other species of *Cocytius*. Scaling of pronotum prolonged to two tufts or crests ; mesial tufts of abdomen seldom distinct, represented by vestigial short carinae. Base of hindwing black ; yellow subbasal area completely separated into three patches.

♂. Foretibia as long as, midtibia about 1 mm., and hindtibia about 2 mm. longer than, the respective first tarsal segment. Foretarsus with comb on segments 3 to 5, segments 1 and 2 with one internal row of spines, which is more or less incomplete ; the external row of segment 2 is irregular, the apical spine prolonged ; the other segments have very few spines, mostly apical, representing rows 1, 2, 4, first segment nearly twice as long as the second, segments 2 to 5 together half as long again as the first. Clasper comparatively small for a species of this genus ; harpe with a flat, rather short, obliquely rounded, process (Pl. XXXVII. f. 8), which is densely hairy at upper apical margin and bears on the external side (towards the clasper) a series of sharp, recurved, marginal teeth (Pl. XXXVII. f. 9) ; above the base of the harpe there is a strongly chitinised fold which is clothed with long and more or less horizontal bristles. The penis-funnel is prolonged (Pl. XXXVII. f. 8), somewhat bone-shaped in a lateral view, dilated and truncate at end, ventrally open, this opening elongate lyre-shaped ; the penis-sheath is very slender and apically produced into an obtuse flat lobe which appears pointed in a side-view, and is gently curved ; no teeth. Tenth tergite (Pl. XXVII. f. 35) comparatively

short, suddenly curved downward at apical third, somewhat dilated before this hook, tip slightly spatulate (Pl. XXVII. f. 36); sternite membranaceous, without a lobe, differing in this respect from all the other species of *Cocytius*, as well as from the species of *Protoparce*.

♀. Spination of foretarsus almost normal, row 3 of segment 5 dense. Proportional length of tibiae and first tarsal segments as in ♂; first segment of foretarsus as long as segments 2 to 5 together, these being much shorter than in ♂. Vaginal plate (Pl. XIX. f. 8) very much less chitinised than in the other species of *Cocytius*, being for the most part membranaceous and almost regularly folded, the lateral edges are stronger; there is a longitudinal mesial groove from the month of the vagina backwards; within this groove we find a rod-like, smooth, glossy, strongly chitinised, carina, which vanishes near the distal margin of the plate; at each side of the vaginal aperture there is a stronger chitinised obliqne short fold.

Larva with seven white oblique stripes, which meet on the back, but do not extend laterally below the middle.—Food: *Anona*.

Pupa: tongue-case rolled in, making 2½ windings, not strongly ringed, almost smooth towards apex; eye more prominent than in *antaeus*; mesonotal and abdominal rough patches similar to those of *antaeus*, first abdominal tergite more roughly grooved at the base than in *antaeus*, eighth segment without patch, only with some dispersed punctures; cremaster narrower than in *antaeus*.

Hab. Tropical America from Mexico to Southern Brazil; West Indies.

In the Tring Museum one chrysalis, and 6 ♂♂, 18 ♀♀ from: Jalapa, Mexico; Bogota; Aroa and Merida, Venezuela; Brit. Guiana; Minas Geraes; Rio de Janeiro; Jamaica.

32. Cocytius beelzebuth.

**Amphonyx beelzebuth* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 63. n. 2 (1895) (Brazil;—coll. Charles Oberthür); Schaus, *Ent. News* vi. p. 141 (1895) (syuonymy).

Amphonyx godarti Boisduval, *l.c.* t. 5. f. 1 (1875) (*laps. cal.*).

Amphonyx vivularis, Druce (*non* Butler, 1875), *Biol. Centr. Amer., Lep. Het.* i. p. 18. n. 3 t. 3. f. 4 (1881) (partim; Chontales, Nicaragua, Chiriqui).

Cocytius beelzebuth, Kirby, *Cat. Lep. Het.* i. p. 686. n. 4 (1892) (*Hab.* ?).

Cocytius godarti, Rothschild, Nov. Zool. i. p. 914(1894); Bönningh., *Iris* xii. p. 114. n. 14 (1899) (Rio de Janeiro).

♂♀. Owing to an error in the letterpress of Boisduval's Plate V., where the present species is named *godarti* instead of *beelzebuth*, the names of *beelzebuth* and *godarti* have several times been misapplied.——The basal and submarginal areas of the forewing are greener than in any other species of *Cocytius*, and there is a green patch distally and costally of the stigma; the scaling in cellule M^1—M^2 is, on the underside, less dense than elsewhere on the wing, the scales of the upper layer being hair-like; that cellule is, therefore, somewhat transparent, except towards margin; a similar process of reduction is going on in cellule R^3—M^1; the hindwing has no transparent patches, but vestiges of such are noticeable between R^2 and M^2 close to cell proximally of the band of yellow discal spots. Foretarsus with the comb of spines on segments 2 to 5 in ♂, the comb much less conspicuous in ♀, the spines being in this sex more normal in position and direction, pointing more distad than in ♂. Midtibia a little longer than (♂), or as long as (♀), hindtibia as long as (♂), or a little longer than (♀), respective first tarsal segments.

♂. Tenth abdominal tergite (Pl. XXVII. f. 43. 44) elongate, widest in middle,

slightly hooked, pointed, longitudinally impressed from tip to middle on the ventral side (Pl. XXVII. f. 44), the edges of the groove notched, ending proximally in a tooth-like ridge, before which (at proximal side) there is a larger number of hairs ; sternite with a long, curved, mesial lobe, which is gradually narrowed to a point (*Xe*), the subdorso-lateral edge of the sternite is somewhat recurved, forming a fold which bears some hairs. The clasper is not larger than in *lucifer*, differing obviously in size from that of *antaeus* and *duponchel* ; harpe ventrally produced into a distal process, somewhat as in *Amphimoea walkeri*, this process slightly spatulate, the upper edge of the harpe not dentate, but proximally divided into two low ridges (Pl. XXXVII. f. 10) ; there is no conspicuous dense tuft of bristles on the harpe or near it. Penis-sheath produced into an apical lobe (the tip of which is broken off in the only ♂ dissected) ; there is no tooth ; before end we find another lobe (Pl. XXIX. f. 10) which points proximad, but does not project beyond edge ; the sheath protrudes from a short penis-funnel, which is collar-like, open ventrally, clothed with minute hairs, and bears dorsally a strongly chitinised flat process which narrows distally and is truncate-sinuate at the end.

♀. Vaginal plate (Pl. XIX. f. 9) resembling that of *C. lucifer* to a certain extent ; the opening of the vagina is free, the proximal and lateral edges raised in a semicircle ; behind the aperture, within the semicircular wall, stands a fold or elongate tubercle at each side ; the aperture is less distal in position than in *lucifer*, but much more distal than in *antaeus*.

Larva and chrysalis not known.

Hab. Nicaragua to Rio de Janeiro, probably in all suitable localities in tropical continental America.

In the Tring Museum 1 ♂ from Espiritu Santo, and 1 ♂ and 1 ♀ without locality (from German dealers).

33. Cocytius duponchel.

Amphonyx duponchel Poey, *Cent. Lép. Cuba* texte & f. 4 (1832) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 67 (1865) (Cuba) ; id., *l.c.* vi. p. 329 (1866) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 599. n. 1 (1877) (Haiti ; Jamaica) ; Gundl., *Contr. Ent. Cubana* p. 207 (1881) (*l.* ou *Anona & Bocagra*).

Macrosila jatrophae, Walker, *List Lep. Ins. B. M.* viii. p. 200. n. 4 (1856) (partim) ; Clem., *Journ. Ac. Sc. Philad.* iv. p. 162. n. 54 (1859) (partim).

Amphionyx (!) *duponchelii* (!), Lucas, in Sagra, *Hist. Cuba* vii. p. 299 (1856).

Macrosila duponchel, Herrich-Sch., *Corresp. Bl.* p. 59 (1865) (Cuba).

Amphonyx godarti Boisduval, *Spec. Gén. Lép. Hét.* i. p. 65. n. 4 (1875) (Minas Geraes ♀ ;—coll. Charles Oberthür) ; Schaus, *Ent. News* vi. p. 142 (1895) (= *affinis*).

**Amphonyx duponchelii* (!), Boisduval, *l.c.* n. 5 (1875) (Cuba, ♂) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 17. n. 1 (1881) (Chiriqui , Haiti ; Jamaica ; Cuba ; Trinidad) ; Pitt. & Bioll., *Lep. Het. Costa Rica* p. 11 (1897).

**Amphonyx circularis* Butler, *Proc. Zool. Soc. Lond.* p. 11. n. 22 (1875) (Ega, ♂ ;—Mus. Brit.).

Cocytius godarti, Kirby, *Cat. Lep. Het.* i. p. 686. n. 5 (1892) (cit. partim).

Cocytius duponchelii (!), id., *l.c.* n. 8 (1892) (Antilles) ; Rothsch., Nov. Zool. i. p. 541 (1894) (Aroa) ; Bönningh., *Iris* xii. p. 113. n. 12 (1899) (Ric de Janeiro ; rare).

**Cocytius affinis* Rothschild, Nov. Zool. i. p. 92 (1894) (C. Amer. ; Venezuela ;—Mus. Tring) ; id., *l.c.* p. 541 (1894) (Aroa).

♂ ♀. The commonest species of the genus. We cannot find any difference between West Indian and Continental specimens. The black discal dashes R^3—M^2 of the forewing are not prominent. The dirty white stigma is transverse, kidney-shaped. The transparent space R^1—R^2 of the hindwing is, at R^1, shorter than the black marginal border is broad.

♂. All the segments of the foretarsus have the second internal row of spines developed into a many-toothed comb; the other rows of spines are reduced; the first segment has only the external row inclusive of the numerous additional externo-lateral, irregularly placed, spines: the second and fourth rows are indicated by one or two spines apically; the second segment with a few external spines representing row 1, the third segment with still less spines, fourth and fifth segments with only the comb, and at apex a single spine as a remnant of row 1; first segment very much shorter than tibia, little longer than the second, very faintly curved. First segments of mid- and hindtarsus as long as the respective tibia. Tenth abdominal segment similar to that of *lucifer*; the sternite much broader and also shorter. Clasper very large; its dorso-apical margin strongly curved inwards; harpe an elongate triangular process (Pl. XXXVII. f. 5) curved upwards at end, pointed, sharply dentate along its subventral edge, and also at the upper edge near apex; a large tuft of long and strong bristles at the upper edge near the base of the process. Penis-sheath (Pl. XIX. f. 14) armed at end with a long, horizontal, slightly curved tooth, which bears another smaller tooth at the proximal side.

♀. The comb of spines on the foretarsus is not well marked, the spines of the second internal row being directed distad, as in the case of an ordinary tarsus; but these spines are rather close together, and the comb-like arrangement becomes more apparent on the distal segments; all four rows present on all the segments; first segment almost as long as the tibia, nearly twice the length of the second segment. First segments of mid- and hindtarsus about 1½ mm. longer than the respective tibia. Vaginal plate broad, the slanting lateral edges somewhat recurved (Pl. XIX. f. 6), forming a low ridge; mouth of vagina beyond middle, armed proximally at each side with a triangular flat lobe, the apex of which is more or less rounded. The forewing is rather prominently marked with white; there is a white, generally conspicuous, dash distally of stigma.

Larva not known. Pupa: tongue-sheath much shorter than in the other species (*cluentius*, *antaeus*), only 12 mm. long from the base in a straight line to the end, ringed as in *antaeus*, the underside smooth; abdominal patches as in *cluentius*, eighth segment without one, all the patches narrower in middle than towards sides.

Hab. Neotropical Region inclusive of the West Indies.

Poey, when describing this species, said: "J'ai suivi MM. Latreille et Godart (Enc. méth.) dans l'usage de ne point écrire les noms propres au génitif."

In the Tring Museum 1 pupa, 130 odd specimens from: Jamaica; Cuba; Mexico, southward to Bolivia and southern Brazil.

34. Cocytius antaeus.

Sphinx antaeus Drury, *Illustr. Ex. Ent.* ii. p. 43. t. 25. f. 1 (1773) (Jamaica).

Sphinx caricae, Müller (*nom* Linné, 1758), *Naturs.* v. 1. p. 638. n. 11. t. 20. f. 2 (1774).

Sphinx jatrophae Fabricius, *Syst. Ent.* p. 538. n. 8. (1775) (= *antaeus* Drury, *Ins.* 2. t. 25. f. 1; Merian. Surin. t. 38!).

Cocytius jatrophae, Hübner, *Verz. bek. Schm.* p. 140. n. 1497 (1822) (=*medor*=*hylaspes*).

Amphonyx antaeus, Poey, *Cent. Lép. Cuba* (1832); (=*caricae* of Müller; =*jatrophae*=*hylaspus*=*medor*); Smith, *Trans. Am. Ent. Soc.* xv. p. 153 (1888) (Florida); Edwards, *Bull. U. St. Nat Mus.* xxxv. p. 45 (1889) (liter. rel. to transform.).

Macrosila antaeus, Walker, *List Lep. Ins. B. M.* viii. p. 200. n. 4 (1856) (partim; Jamaica; Haiti; Mexico; Honduras; Ega).

Ancistrognathus antaeus, Wallengren, *Öfv. Kongl. Sv. Vet. Ac. Handl.* p. 138 (1858).

Amphonyx jatrophae, Boisduval, *Spec. Gén. Lép. Hét.* i. 64. n. 3 (1875) (Am. mer. ; Antilles).
Cocytius antaeus, Kirby, *Cat. Lep. Het.* i. p. 686. n. 3. (1892).

We do not believe that Cramer's *hydaspus* is based on anything else but a specimen of *antaeus* with the abdomen of *cluentius*, the posterior spots of which were bleached to white; the bad drawing of the hindwing suggests that the specimen was mutilated.

♂ ♀. Cellule M^1—M^2 of forewing semitransparent, the scaling not being dense and the scales of the upper layer being hair-like on the under surface, the black dash in this cellule, therefore, more or less obliterated; the dash R^3—M^1 much heavier, but the modification of the scaling also here apparent; the buffish white subbasal line, which is separated into a costal, a more distal cellular, and a postcellular portion, differs from the same line of *duponchel* in the posterior portion being more distal and standing at right angles to M, this portion being in fact a little farther from the base than the costal one, while in *duponchel* the reverse is the case; the postdiscal line more curved than in *duponchel*. The transparent spaces of the hindwing are long, space R^1—R^2 being obviously longer than the brown border of the wing is broad; the spaces are incised distally, the brown border being more or less strongly dentate between the veins; cellule M^2—(SM^1) anteriorly more or less semitransparent. Underside often rather conspicuously washed with ochre yellow.

♂. Foretibia very little, midtibia obviously, longer and hindtibia a little shorter, than the respective first tarsal segments; anterior tarsus as in *duponchel*, but the first segment possesses only the external spines, the comb being but represented by one or two apical spines, the other segments with a few more spines than in *duponchel*. Tenth abdominal tergite (Pl. XXVII. f. 41. 42) somewhat bi-arcuate in side-view, apex pointing downward and distad, more or less acute, long; sternite similar to that of *lucifer*, but the sides more parallel and the apex rounded-truncate. Clasper large; harpe with a strong subcylindrical process, which is rather club-shaped, being dilated at end, the distal part heavily dentate; above the harpe near the base of the clasper is a high fold (Pl. XXXVII. f. 6) beset with numerous long bristles. The penis-funnel is represented by a kind of collar-shaped fold, which is open ventrally and is clothed with minute hairs; penis-sheath (Pl. XXIX. f. 15) with one small tooth before end.

♀. Foretarsus with all four rows of spines present, comb of second segment not so regular as in ♂, and the spines directed more distad; foretibia little longer, mid- and hindtibia 1 to 2 mm. longer, than the respective first tarsal segment. Vaginal plate very large, strongly chitinised also apically, but with few or no scales (Pl. XIX. f. 5), subtruncate, lateral edges incrassate or recurved; mouth of vagina free, with the edge not so much raised as in *lucifer* and *beelzebuth*, more proximal in position than in any other species, being much nearer the base than the apex. Specimens that have copulated bear generally a high longitudinal crest of a whitish substance on the vaginal plate.

Larva greyish green, one broad white oblique stripe ending at the horn; stigmata yellow; no green oblique side-bands on segments 4 to 11.—Food: *Anona*, not *Jatropha*.

Pupa: long and rather slender (length 90 mm.), eighth abdominal tergite with divided patch of tubercles.

Hab. Neotropical Region, including the Antilles and Florida, occasionally farther north.

a. C. antaeus medor.

Merian, *Ins. Surin.* t. 3. & 38. (1705) (imago).
Sphinx hydaspus Cramer, *Pap. Ex.* ii. p. 31. t. 118. f. A (1777) (Surinam ; artefact !).
Sphinx medor Stoll, in Cramer, *l.c.* iv. p. 215. t. 394. f. A (1782) (Surinam).
Sphinx hydaspes (!), id., *l.c.*
Sphinx anonae Shaw, *Natur. Miscell.* xiv. t. 566. 567. (180–).
Amphonyx (!) *jatrophae*, Boisduval, *Cons. Lép. Guatemala* p. 75 (1870) ("Linné" as author !).
Amphonyx medor, Butler, *Trans. Zool. Soc. Lond.* ix. p. 599. n. 4 (1877) (Mexico) ; Schaus, *Ent. News* vi. p. 142 (1895) (= *tapayusa*) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 17. n. 2 (1881) (Jalapa ; Valladolid ; Yucatan ; Ecuador ; Guiana).
Amphonyx tapayusa Moore, *Proc. Liverp. Soc.* xxxvii. p. 245. t. 7. f. 1 (*l.*) (1883) (Brazil, E. D. Jones).
Amphonyx antaeus, Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 345 (1876) (Surinam ; = *jatrophae* = *hydaspes* = *medor*) ; Edw., *Ent. Amer.* ii. p. 163 (1887) (pupa).
Cocytius medor, Kirby, *l.c.* p. 686. n. 1 (1892) (Mexico ; S. Amer.).
Cocytius hadaspus, id., *l.c.* n. 2 (1892) (Surinam) ; Rothsch., Nov. Zool. i. p. 91 (1894) (= *medor*).
Cocytius antaeus, Kirby, *l.c.* n. 3 (1892) (partim) ; Bönninghs., *Iris* xii. p. 113. n. 11 (1899) (Rio de Janeiro ; larva !).
Cocytius tapayusa, Kirby, *l.c.* p. 687. n. 9 (1892).
Cocytius cluentius, Troschel, *Ent. News* xi. p. 334 (1900) (Chicago, Oct. 6th).

♂ ♀. The continental form. Darker than the following, the forewing more variegated ; the black markings more prominent ; the yellow patch of the hindwing deeper sinuate as a rule.

Hab. Florida to South Brazil.

In the Tring Museum 1 pupa, and 12 ♂♂, 30 ♀♀ from : Mexico ; Costa Rica ; Venezuela, etc.

b. C. antaeus antaeus.

Sphinx antaeus Drury, *l.c.*
Amphionyx (!) *jatrophae*, Lucas, in Sagra, *Hist. Cuba* vii. p. 299 (1856) (Cuba).
Macrosila anthaeus (!), Herrich-Sch., *Corresp. Bl.* p. 59 (1865) (Cuba).
Amphonyx antaeus, Grote & Rob., *Proc. Ent. Soc. Phil.* v. p. 66 (1865) (partim ; Cuba) ; iid., *l.c.* vi. p. 329 (1866) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 599. n. 3 (1877) (Haiti ; syn. partim) ; Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Surinam) ; Gundl., *Contr. Ent. Cubana* p. 206 (1881) (syn. partim ; Cuba, descr. of larva) ; Dyar, *Proc. U. St. N. Mus.* xxiii. p. 256 (1900) (Florida ; descr. of stages of larva).
Cocytius antaeus, Kirby, *l.c.* n. 3 (1892) (syn. partim ; Antilles) ; Rothsch., *l.c.*

The insular form. The differences between this and the preceding subspecies are by no means constant.

Hab. Antilles.

In the Tring Museum 13 ♂♂, 2 ♀♀ from : Jamaica ; Nassau, Bahamas (Sir G. Carter).

35. **Cocytius lucifer** spec. nov.

**Amphonyx morgani*, Boisduval (*nom* Walker, 1856), *Spéc. Gén. Lép. Hét.* i. p. 66. n. 6 (1875) ("Sierra Leone" *err. loc.* ;—coll. Charles Oberthür).
**Amphonyx rivularis* Butler, *Proc. Zool. Soc. Lond.* p. 11. n. 22 (1875) (partim ; ♀) ; id., *Trans. Zool. Soc. Lond.* ix. p. 599. n. 2. t. 94. f. 6 (♀) (1877) (*hab ?*) ; Druce, *Biol. Centr. Am., Lep. Het.* i. p. 18. n. 3 (1883) (partim).
Cocytius rivularis, Kirby, *Cat. Lep. Het.* i. p. 686. n. 6 (1892) (partim) ; Rothsch., Nov. Zool. i. p. 91 (1894) ; id., *l.c.* p. 541 (1894) (Aroa).

The ♂ of *rivularis* described before the ♀ by Butler, *l.c.*, belongs to *C. duponchel.* The insect erroneously identified by Boisduval as Walker's *morgani*, and described by him as such, *l.c.*, is the present species.

♂♀. The brownish black markings of thorax and forewing prominent on the greyish green ground. The discal streaks R^3–M^2 of the forewing, though often thin, are both well marked. The markings of the upperside, the marginal area of the hindwing, and the underside of the wings are often more or less walnut-brown. The mesial line of the abdomen is mostly prominent, sometimes faint, or widely interrupted. Both sexes with comb of spines on segments 2 to 5 of foretarsus. Foretibia a little longer than first segment of foretarsus, this segment about twice the length of the second. Midtibia barely 1 mm., hindtibia $2\frac{1}{2}$ to 3 mm., shorter than the respective first tarsal segment.

♂. Tenth abdominal tergite (Pl. XXVII. f. 37. 38. 39. 40) prismatically compressed, carinate below, slightly convex above, rounded-dilated distally, the apex a little curved ventrad, with three broad and short teeth (Pl. XXVII. f. 39), of which the middle one is the shortest; ventral surface with long bristles forming a beard before apex; sternite flat, slightly convex ventrally, sole-shaped (Pl. XXVII. f. 40). Clasper smaller than in *duponchel*; harpe (Pl. XXXVII. f. 7) with long curved process, which is somewhat ladle-shaped, and is sharply dentate distally at lower and upper edges, dorsal side of harpe densely clothed with bristles, a patch of very long bristles dorsally of base of harpe. Penis-sheath with two small teeth before the end (Pl. XXIX. f. 13), the upper one of them minute.

♀. The vaginal plate (Pl. XIX. f. 7) less broad than in *duponchel*, the mouth of the vagina subapical, the edge of the opening raised, but there is no special armature.

Early stages unknown.

Hab. Neotropical Region, exclusive of the Antilles.

In the Tring Museum 9 ♂♂, 9 ♀♀ from: Jalapa (*type*); Orizaba; British Honduras; Costa Rica (Underwood); Rio Dagna, Colombia (Rosenberg); Aroa, Venezuela.

XVIII. AMPHIMOEA gen. nov.—Typus: *walkeri*.

Amphomyx, Boisduval (*non* Poey, 1832), *Spec. Gén. Lép. Hét.* i. p. 67 (1875).
Cocytius, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 686 (1892).

♂♀. A connecting link between *Protoparce* and *Cocytius*. Terminal surface of palpus more square, and the third segment little more prominent, than in *Protoparce*. ♂ without the peculiar comb of spines on the foretarsus found in *Cocytius*, ♀ with prolonged ciliae at base of antennal segments. Paronychium with *two* lobes on each side. Abdomen with four yellowish dorsal stripes; yellow lateral patches of segment 3 and following longitudinal. Disc of hindwing semitransparent.

Larva and chrysalis are probably those figured as *jatrophae* by Burmeister (see below).

Hab. Tropical Continental America.

The only species agrees in most characters with *Cocytius*, but differs remarkably in the third segment of the palpus not being prolonged to a naked horn. It does not fit into *Cocytius*, nor can it be placed into *Protoparce*.

36. Amphimoea walkeri.

**Amphonyx walkeri* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 67 n. 7 (1875) (Oyapock ; Guyana ;—coll. Charles Oberthür) ; Schaus, *Ent. News* vi. p. 142 (1895) (=*staudingeri*=*magnificus*) ; Druce, *Biol. Centr. Amer., Let. Het. Suppl.* p. 311. n. 3. t. 65. f. 4 (1896) (Chontales, Nicaragua ; Chiriqui ; Guiana).

**Amphonyx staudingeri* Druce, *Ann. Mag. N. H.* (6). ii. p. 237 (1888) (Chiriqui ;—coll. Staudinger).

Cocytius staudingeri, Kirby, *Cat. Lep. Het.* i. p. 686. n. 7 (1892) (Nicaragua ; Panama).

Cocytius walkeri, id., *l.c.* p. 687. n. 11 (1892) (Cayenne !).

**Cocytius magnificus* Rothschild, Nov. Zool. i. p. 92. t. 7. f. 21 (1894) (Brit. Guiana ;—Mus. Tring).

Amphonyx walkeri (?), Bönninghausen, *Iris* xii. p. 114. n. 15 (1889) (Rio de Janeiro).

♂ ♀. Body buff yellow beneath ; ventral scales of second segment of palpus very long, mostly buff yellow. Proportional length of tibiae and first tarsal segments nearly as in *Cocytius lucifer*.

♂. Tenth abdominal tergite (Pl. XXVII. f. 33) strongly compressed, carinate above, apex suddenly curved downwards ; sternite very short, reminding one in size and position of that of *Protoparce trimacula*, the lobe shorter than broad, truncate (Pl. XXVII. f. 34), with the angles rounded. Clasper not exaggerated in size, as it is in *Cocytius duponchel* ; harpe (Pl. XXXVII. f. 11) resembling that of *Protoparce ochus*, with a curved ventral process and a flat dentate upper ridge, no tuft of long bristles upon or near the harpe. Penis-sheath (Pl. XXIX. f. 16) armed with two small teeth, one near the end, the other more proximal.

♀. Vaginal plate (Pl. XIX. f. 10) laterally recurved, forming rather prominent ridges, mesially convex ; the mouth of the vagina subapical.

Hab. Tropical Continental America, from Nicaragua to Southern Brazil, probably occurring farther north.

In the Tring Museum 2 ♂♂, 3 ♀♀ from : Pambilar, Ecuador ; British Guiana; Surinam ; San Leopoldina, S. Brazil.

In coll. Charles Oberthür a fine series from St. Rosa, Colombia ; Guiana ; and Petropolis. In the Museum at Bern from Para (Goeldi).

The pupa figured as that of *C. antaeus* (=*jatrophae*) by Burmeister, *Descr. Rép. Argent.* v. *Atlas* t. 11. f. 1. 5A. 5B (1879), and which we received from St. Catharina is, we believe, that of *A. walkeri*, as it differs remarkably from the pupae of *eluentius*, *duponchel*, and *antaeus*, which are contained in the Tring Museum. It might possibly be that of *C. lucifer* (= *riculuris* auct.), but we expect the pupae of *lucifer* to possess the peculiar rough patches found in the other species, and not met with in the chrysalis figured by Burmeister. This chrysalis is shorter and thicker than that of *antaeus* ; the tongue-case is longer and evenly curved, while in *antaeus* it is nearly straight before the clubbed end ; the rings are high and extend to the middle carina on the underside, while in the pupae of *Cocytius* the underside has no rings, they extend also closer to the end of the free tongue-case, and each ring is laterally (as well as dorsally and ventrally) interrupted. The rough patch behind the thoracical stigma is indicated, but there are *no rough patches* either on the metanotum or on the abdomen. The cremaster is broad, rounded, terminating in two subapical and two apical points.

The larva and chrysalis figured by Merian, *Ins. Surin.* t. 28, belong possibly to this species ; the chrysalis is certainly not that of *duponchel*, and it is much too short for *antaeus*, though it has, like *antaeus*, the tongue-case subapically straightened.

The larva figured by Burmeister agrees with that of Merian t. 38 in having dark green lateral bands besides the posterior white band which ends at the base of the horn. It lives on *Jatropha*. The excrements are small.

XIX. PROTOPARCE.—Typus : *rustica*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim) ; type : *ocellata*).
Manduca obscura Hubner, *Samml. Ex. Schm.* (1806–24).
Hyloicus id., *Verz. bek. Schm.* p. 138 (1822) (partim) ; type : *pinastri*).
Acherontia, id., *l.c.* p. 139 (1822) (partim).
Cocytius id., *l.c.* p. 140. (1822) (partim ; type : *antaeus*).
Phlegethontius l.c. p. 140 (1822) (partim ; type : *cluentius*).
Protoparce id., Burmeister, *Schm. Bras.* p. 6 (1856) (type : *rustica*).
Macrosila Walker, *List Lep. Ins. B. M.* viii. p. 198 (1856) (partim ; includes *rustica*).
Diludia Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 188 (1865) (type : *brontes*).
Syzygia id., *l.c.* p. 189 (1865) (type : *afflicta*).

♂ ♀. Tongue as long as the body or longer. Genal process nearly reaching end of pilifer. Labrum raised mesially into a rounded tubercle, truncate in front. End-segment of antenna long, thin, clothed with long dispersed and half erect scales. Palpus large, terminal surface in a plane with frons, segment 3 minute, 2 shorter but somewhat broader than 1. Eye large, feebly or not at all lashed. Tibiae *without spines.** First segment of midtarsus with a comb of long bristles near base ; first segment of anterior tarsus with a number of spines at base exteriorly, besides the usual external row, some of the spines of the segment long in a number of species. Spurs unequal, long terminal one of hindtibia varying in the different species from one-half to three-quarters the length of the first tarsal segment. Mesonotum with a short double crest of scales in many species. Pulvillus present or absent ; paronychium always present, with *one* lobe on each side.

♂. Antenna in some species (*carolina*, *dilucida*, *afflicta*, etc.) obviously longer and thicker than in others (*lucetius*, *petuniae*, etc.) ; segments laterally impressed, ciliae of basal row short ventrally, the distal row of ciliae not extending to the ventral surface. Tenth tergite slender, more or less slightly hook-shaped, dorsally impressed in middle proximally, ventrally subcarinate before end, with dispersed erect or suberect hairs, tip pointed or slightly sinuate ; tenth sternite with a mesial lobe which varies in length in the genus, the lobe often canoe-shaped, with the end truncate or sinuate. Penis-sheath armed at or before end with a prominent, triangular, compressed, more or less horizontal tooth, which is sometimes replaced by one or two small ones ; three minutely granulose, membranaceous, compressed lobes in the interior of the sheath (Pl. XXIX. f. 21). The clasper is sole-shaped ; its upper margin dilated before end and turned inward in all species except *lefeburei* ; the inner surface is densely clothed with stiff hairs, which point dorsad and proximad ; harpe normally with a ventral, more or less horizontal, hook, and a large dentate process or ridge lying more or less flat on the inner surface of the clasper. In one species (*rustica*) the ventral hook alone is preserved ; in others (*oclus*, *lefeburei*, *petuniae*) the dentate part is reduced in size, while in others again (*florestan*, *sesquiplex*, *trimacula*, etc., etc.) there is no ventral hook ; the harpe of *dalica* (= *garleppi*) stands intermediate between the second and third harpe-form. In all species there is a conspicuous patch of suberect scales (generally white) at the base of the dentate lobe of the harpe, *rustica* without such a lobe being alone an exception.

♀. The antennal segments are not, or very feebly, impressed laterally ; the basal ciliae are sometimes slightly prolonged (this is especially the case in

* *P. quinquemaculatus* alone has a few spines at the tip of the foretibia.

lefeburei). The eighth abdominal tergite is feebly sinuate, or rounded-truncate ; the sternite strongly chitinous, forming a glabrous postvaginal plate. The vaginal aperture is covered in front by a broad chitinous lobe of variable length ; there is a transverse ridge at the base of the lobe where the intersegmental membrane joins the vaginal armature ; chitin-plate of seventh sternite rather short, rounded at end, or sinuate, the distal part of the sternite membranous or semimembranous.

Larva : cylindrical, head rounded, not obviously narrowed above ; horn simply curving downward, granulose ; segments 4 to 11 with oblique side-bands (except in *albiplaga*). Not known of many species.—Food : *Solanaceae*.

Pupa : tongue-case free, curved, the tip nearly touching the breast.

Hab. America, from the North to the South, most plentiful in the tropics. Thirty species.

Attempts have been made by several authors to divide the assemblage of species here united under *Protoparce* into a number of genera. We have vainly endeavoured to find reliable characters to distingnish generically such different-looking insects as *rustica*, *ochus*, *lefeburei*, *brontes*, *florestan*, *sexta*, etc., etc. It is true the species do not agree in all respects. Yes, there are even groups of closer allied species in *Protoparce* as conceived by us ; but the differences between these groups disappear, the gaps are filled up by intergraduate forms, when all the species are compared. Some species have a larger and more prominent head than others, some have longer antennae, larger or more obviously lashed eyes, or long and strong spines on the foretarsus, or possess very long spurs, or mesial tufts of half-erect scales on the abdomen, or similar tufts at the apical edges of the tergites; many have yellow abdominal patches, and many have none ; there may be a large pulvillus in one species, and a near relative may be without such a pad. Not one of these characters can be relied upon in splitting up the genus *Protoparce* into several definable genera, which contain at the same time the species which are nearly related to one another. It is only possible to define such "genera" as *Diludia* and *Syzygia*, if one disregards the intergraduate forms altogether.

We emphasize that the presence or absence of a pulvillus, though a very convenient character for the separation of the species in a key, cannot serve as a basis for the division of the genus into two natural groups.

The genus is essentially tropical ; two species extend far into the southern temperate zone (*sexta*, *petuniae*), two into the northern temperature zone (*sexta*, *quinquemaculatus*). It represents the stock from which several genera of the Nearctic region have originated. There are two very interesting points to be observed in this respect :

1. The similarity between the genera *Atreus*, *Chlaenogramma*, *Daremma*, and some species of *Protoparce* (*rustica*, *florestan*), in pattern and structure is so close that one can scarcely fail to recognise the near relationship of these insects.

2. The distinguishing characters of those offshoots from *Protoparce*—*i.e.* from ancestral forms which would fit into *Protoparce* as conceived by us—are essentially negative, consisting of differences which are the outcome of a progressive reduction of organs. It is very interesting to follow this reduction of organs as it goes on and on in the assemblage of genera placed here between *Protoparce* and *Ellema*. The several series into which these genera arrange themselves demonstrate clearly, by the close connection still existing between the genera of each series, that the direction of development is from the forms with developed organs to those with reduced organs ; that *Protoparce* is not the heterogenous product of a convergent

development of offshoots from *Daremma*, *Atreus*, *Chlaenogramma*, etc., etc., but that these genera are derivations from a common stock similar to *Protoparce*, possessing a long tongue, a pulvillus, a paronychium, a frenulum, a midtarsal comb and unarmed tibiae. The pulvillus disappears already among *Protoparce*. The loss or reduction of one or the other of these organs is accompanied in most cases by the appearance of spines on the tibiae, beginning with the foretibia. With the reduction of the tongue goes hand in hand a shortening of the tongue-case of the chrysalis, the projecting "nose" disappearing finally. In the present group the pulvillus is the first to be lost, and then the paronychium; while in the tribe *Sphingulicae*, the forms with a short terminal antennal segment, the paronychium is lost in one genus, while the pulvillus is still there.

The distinguishing characters of the species of *Protoparce* are often not very pronounced, especially as regards the pattern of the wings and body. In several instances we have not been able to separate two species with certainty except by the help of the genital armature. On the other hand there are species, quite distinct in pattern and certainly not forms of the same species, which show no differences in the sexual organs. The opinion held by many entomologists that different species are always different in the genital armature is quite erroneous. The best instance to repudiate that assumption—it is, of course, nothing else but an assumption—is that of *Chlaenogramma jasminearum* and *Protoparce florestan*, which, though generically distinct, have nevertheless exactly the same genital armature in both sexes.

Key to the species:

a.	Claw-segment without pulvillus . .	*b.*
	„ with „ . .	*q.*
b.	Forewing without complete lines, for the greater part clayish tawny ochraceous like thorax . .	49. *P. ochus.*
	Forewing without transverse lines except a postdiscal one; for the greater part greyish white . .	45. *P. leucoptera.*
	Forewing with numerous transverse lines; greyish brown, yellowish, or olive	*c.*
c.	Second abdominal segment without yellow side-patch . . .	51. *P. stuarti.*
	Second abdominal segment with yellow side-patch	*d.*
d.	Abdomen with more than three yellow side-patches . . .	*e.*
	Abdomen with three yellow side-patches	*m.*
	Abdomen without yellow side-patches	*r.*
e.	White spots of fringe of forewing mere dots, very much smaller than the brown portions of the fringe; thorax olive, or olive-green; foretibia not armed	*f.*

As before, but thorax ashy grey; foretibia with some spines at tip . 39. *P. quinquemaculatus.*

White spots of fringe ashy grey, about the same size as the brown portions . . . . . *h.*

f. White dorsal dots of abdomen small or absent; forewing with large black median costal area . . 41. *P. lucetius.*

White dorsal dots of abdomen conspicuous; forewing without large black median costal area . . . *g.*

g. Forewing above greenish grey; hindwing above with two distinct whitish bands . . . . 38. *P. afflicta.*

Forewing above not greenish grey; hindwing above with three or four whitish bands . . . . 37. *P. sexta.*

h. Forewing above pale grey (ground colour); abdomen with two widely separated rows of white dorsal dots . . . . . 40. *P. dilucida.*

Forewing above in various brown shades; abdomen with the white dots close together on each segment, or without such dots . . *i.*

i. Forewing above with a pale submarginal line which is parallel to outer margin, is not zigzag, and does not extend to apex of wing . 44. *P. hannibal.*

The submarginal line zigzag . . . *j.*

j. Forewing with five large sericeous black discal patches which are sharply marked; spots of fringe and heavy submarginal line pale buff; sides of mesothoracic tegula creamy buff, very sharply contrasting with the broad black mesial stripe of the tegula . . . *k.*

Forewing more uniform in colour; black discal patches smaller and less prominent, the dark area formed by them distally less concave between C and R^3; submarginal line whitish grey; lateral border of tegula less pale, black streak narrower . . . *l.*

k. Underside of abdomen shaded with brown; sexual armature see Pl. XXXVI. f. 3; Pl. XXIX. f. 27. 46. *P. pellenia.*

	Underside of abdomen not shaded with brown; sexual armature see Pl. XXXVI. f. 2; Pl. XXIX. f. 26	47. *P. scutata.*
	Pale lateral stripe of thorax and pale markings of forewing more whitish grey; sexual armature see Pl. XXXVI. f. 10 . .	48. *P. tucumana.*
l.	Sexual armature (Pl. XXXIX f. 6, 7)	42. *P. petuniae.*
	„ „ (Pl. XXXIX. f. 2) .	43. *P. occulta.*
m.	A triangular white space in front of stigma	54. *P. albiplaga.*
	No triangular white space in front of stigma	*n.*
n.	First segment of foretarsus with four large spines externally . .	40. *P. dilucida.*
	External spines of foretarsus not remarkably prolonged except apical one	53. *P. rustica.*
o.	Forewing above with white apical patch bordered behind by the oblique black apical line . .	61. *P. corallina.*
	No such white patch . . .	*p.*
p.	Forewing above whitish grey . .	59. *P. sesquiplex.*
	„ „ olive „ . .	60. *P. muscosa.*
q.	Forewing above whitish grey with a blackish brown band running obliquely from costal margin across end of cell to apex of M^1	50. *P. lefeburei.*
	No such band	*r.*
r.	Abdomen with three large yellow side-patches	*s.*
	Abdomen without yellow side-patches	*u.*
s.	A white triangular space in front of stigma of forewing . . .	*t.*
	No white triangular space in front of stigma of forewing; hindwing brown	55. *P. trimacula.*
	No white triangular space in front of stigma of forewing; hindwing for the greater part white . .	52. *P. manducoides.*
t.	Median interspace of forewing above broadly buffish white . . .	56. *P. leucospila.*
	Median interspace of forewing above not buffish white . . .	57. *P. dalica.*
u.	Basal third of hindwing grey, and sharply contrasting with brown outer two-thirds	65. *P. crocala.*

Basal third of hindwing not grey, and not sharply contrasting with brown outer two-thirds . . . *v.*

x. Ground colour of body and wings creamy buff, no white stigma on forewing; no black line on thorax 66. *P. bergi.*

Ground colour more whitish grey; forewing with white stigma . . *w.*

w. Pronotum and anterior part of tegulae brownish black; black spot at each side of metanotum bordered with russet-pink and buff; no black streaks R^3—M^2 on forewing 58. *P. brontes.*

Pronotum with black band which connects the black streaks of tegulae . . . . . *x.*

x. Forewing heavily marked with black lines; a patch before oblique apical line, and ground-colour of disco-marginal area R^1—R^3, extending to costa between postdiscal and second discal lines, greyish white; no black streaks R^3—M^2, or these streaks short and not very distinct; distal margin concave before hinder angle . . 62. *P. lichenea.*

Forewing much less heavily marked, the white colour more extended, two long black streaks R^3—M^2 . 63. *P. florestan.*

Forewing more uniform in colour, much less white, oblique apical line not broadly bordered with white in front . . . . 64. *P. lanuginosa.*

37. Protoparce sexta.

Sphinx sexta Johansson, *Amoen. Acad.* vi. p. 410. n. 81 (1763) (Carolina; Jamaica).
Sphinx carolina Linné, *Mus. Lud. Ulr.* p. 346. n. 6 (1764) (Carolina; Jamaica); id., *Syst. Nat.* ed. xii. p. 798. n. 7 (1767); Fabr., *Syst. Ent.* p. 539. n. 9 (1775); id., *Spec. Ins.* ii. p. 144. n. 21 (1781); id., *Mant. Ins.* ii. p. 94. n. 24 (1787); id., *Ent. Syst.* iii. 1. p. 363. n. 25 (1793); Gmel., *Syst. Nat.* i. 5. p. 2377. n. (1790); Walk., *List Lep. Ins. B. M.* viii. p. 216. n. 4 (1856); Boisd., *Spec. Gén. Lép. Hét.* i. p. 70. n. 1 (1875).
Manduca obscura carolina, Hübner, *Samml. Ex. Schm.* i. t. 170. f. 3. 4. (1806).
Phlegethontius carolina, id., *Verz. bek. Schm.* p. 140. n. 1503 (1822).
Macrosila carolina, Clemens, *Journ. Ac. N. Sci. Philad.* iv. p. 165. n. 59 (1859).
Protoparce carolina, Butler, *Trans. Zool. Soc. Lond.* ix. p. 607. n. 11 (1877).
Phlegethontius sexta, Kirby, *Cat. Lep. Het.* i. p. 688. n. 13 (1892).

♂ ♀. Second segment of palpus as broad as long, rounded ventrally. Antenna long, stout in ♂, hook rather short. Foretibia short and broad, a little longer than first tarsal segment, which bears externally four large spines, besides some small

ones ; the foretarsus is somewhat longer in ♀ than in ♂, and has more small external subdorsal spines. Mid- and hindtibiae as long as the respective first tarsal segments. Spines of abdominal sternites weak.

♂. Tenth tergite of abdomen somewhat dilated before end, which is strongly convex above, apex sinuate (Pl. XXVII. f. 16, distal view); side-margins of sternite dilated before end, curved upward, the dilated triangular portions leaning towards each other ; tip of sternite rounded ; harpe with a long ventral pointed process, which is slightly curved (Pl. XXXVI. f. 4. 5. 6), and a broad upper process or lobe which lies on the surface of the clasper is more or less triangular, and has the apical and dorsal margins dentate ; the size of this lobe is variable. Penis-sheath with a short, broad, acute, terminal tooth as in *petuniae*.

♀. Plate of seventh abdominal sternite about as broad at base as long, truncate. Antevaginal lobe broad, obtuse, rounded triangular, with the indication of a mesial sinus, concave proximally as a rule, the impression bordered proximally at each side by an oblique low ridge or fold, which is sometimes very inconspicuous.

Larva with oblique lateral bands. Tongue-case of pupa straight, reaching about halfway to end of wing-cases.—Food-plants : *Solanaceae*.

Hab. America.

We can distinguish four geographical forms :

P. sexta { *jamaicensis* from the West Indies : Jamaica, Haiti, Cuba, Bahamas ;
sexta from Canada to Honduras ;
paphus from Costa Rica to Argentina ;
caestri from Chili.

The differences between these forms are very slight, *caestri* alone being fairly constant and more easily recognisable.

a. P. sexta jamaicensis.

Browne, *Hist. Jamaica* p. 438. t. 43. f. 7 (1756).

Sphinx carolina Auct. vetust. (partim) ; Walk., *List Lep. Ins. B. M.* viii. p. 216. n. 4 (1856) (partim); Luc., in Sagra, *Hist. Cuba* vii. p. 296 (1856) ; Herr.-Sch., *Corresp. Bl.* iii. p. 59 (1865) (Cuba) ; Grote, *Proc. Ent. Soc. Phil.* v. p. 37 (1865) (Cuba) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 70. n. 1 (1875) (partim).

Sphinx paphus, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 89. n. 1482 (1857) (Haiti).

Macrosila carolina, Grote & Rob., *l.c.* p. 162. n. 81 (1865) (Cuba) ; Gundl., *Contr. Ent. Cubana* p. 210. n. 99 (1881) (Cuba ; larva, pupa).

Protoparce carolina, Butler, *Trans. Zool. Soc. Lond.* ix. p. 607. n. 11 (1877) (partim) ; Dew., *Mitth. Münch. Ent. Ver.* iii. p. 92 (1877) (Porto Rico) ; id., in Wieg., *Arch. Naturg.* p. 12 (1878) (Cuba, larva).

**Protoparce jamaicensis* id., *l.c.* p. 608. n. 12 (1877) (Jamaica ;—Mus. Brit.).

Phlegethontius jamaicensis, Kirby, *Cat. Lep. Het.* i. p. 688. n. 12 (1892) (Jamaica).

♂♀. Differs from *sexta sexta* in being duller in colour, in the forewing being generally more russet, and the hindwing more brown. The difference is not constant.

♂. Dentate lobe of harpe as broad as in the northern continental form *sexta*.

Larva with the black dots proximally of the side-bands not quite so distinct as in *sexta*, sometimes absent (in our *Jamaica* larvae).

Hab. West Indies : Jamaica, Haiti, Cuba, Bahamas.

In the Tring Museum some larvae and 16 ♂♂, 19 ♀♀ from : Jamaica ; Haiti; Nassau, Bahamas (Sir G. Carter).

b. P. sexta sexta.

Sphinx sexta Johansson, *l.c.*

Sphinx carolina Linné, Fabr. et alia, *l.l. c.c.* (partim) ; Drury, *Illustr. Ex. Ins.* i. p. 52 t. 52. f. 1 & Index (1771–73) (N. York) ; Curt., *Brit. Ent.* v. 195 (1828) (England ; larva, imago) ; Steph., *Illustr. Brit. Ent., Haust.* i. p. 118 (1828) ; Abb. & Smith, *Lep. Georgia* i. p. 65. t. 33 (1797) ; Harris, in Sillim., *Journ. Sc. & Art* xxxvi. p. 294. n. 2 (1839) (partim ? including *quinquemaculatus*) ; Glov., *Rep. U. St. Dept. Agric.* p. 157 (1873) (larva and pupa, fig.) ; Harris, *Ins. Inj. Veg.*, ed. Flint, p. 322. figs. 145–47 (1863) (larva, pupa) ; Leydy, *Proc. Ac. N. Sci. Philad.* p. 237 (1882) (life hist.) ; French, *Trans. Dept. Agr. Illin.* xv. p. 168 (1877) (larva) ; Mart., ibid. xviii. p. 103 (1880) (larva) ; Coq., ibid. p. 158 (1880) (larva) ; Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O.; common) ; Kent, in Riley, *Ins. Life* ii. p. 283 (1891) (Mississippi, larva abund.) ; id., *l.c.* iii. p. 338 (1892) (Roxie ; common).

Phlegethontius carolina, Hübner, *l.c.* (partim) ; Grote, *Bull. Buff. Soc. N. Sci.* iii. p. 225 (1876) ; Fern., *Sphing. N. Engl.* p. 31. n. 11 (1886) ; Grote, *Hawk Moths N. Am.* p. 40 (1886) (partim) ; Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 46 (1889) (liter rel. to transf.) ; Beutenm., *Bull. Am. Mus. N. H.* vii. p. 298. t. 4. f. 4. (*i.*) (1895).

Sphinx carolinus (!), Emmons, *Nat. Hist. N.Y.* p. 218. t. 40. f. 10 (1854)

Sphinx nicotianae Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 89. n. 1480 (1857) (Am. sept.).

Macrosila carolina, Clemens, *Journ. Ac. N. Sci. Philad.* iv. p. 165. n. 59. (1859) (pt.) ; id., in Morris, *Syn. Lep. N. Am.* p. 189 (1862) ; Grote, *Bull. Buff. Soc. N. Sci.* ii. p. 227 (1875) (pt.) ; id., *Canad. Ent.* iii. p. 101 (1871) (Alabama) ; Thaxt., *Psyche* i. p. 30 (1874) (Newton, Mass., vii.) ; Edw., *Proc. Calif. Ac.* vi. p. 92 (1876) (on tobacco, Calif.) ; Behr., *Papilio* ii. p. 2 (1882) (California).

**Sphinx lycopersici* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 71. n. 2 (1875) (Calif.) ; Edw., *Ent. Amer.* iii. p. 222 (1888) (Calif.).

Protoparce carolina, Butler, *Trans. Zool. Soc. Lond.* ix. p. 607. n. 11 (1877) (pt.) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 167 (1888) (partim) ; Moff., *Canad. Ent.* xxix. p. 177 (1897) (London, Canada) ; Trum., *Ent. News* viii. p. 27 (1897) (S. Dakota) ; How., *Yearb. U. St. Dept. Agr.* p. 126 (1898).

Macrosila (Sphinx) quinquemaculata, Mann, *Psyche* ii. p. 75 (1877) (partim ; descr. of larva).

Phlegethontius sexta, Kirby, *Cat. Lep. Het.* i. p. 688. n. 13 (1892) (partim).

♂ ♀. The white submarginal zigzag line of the forewing is, as a rule, very pronounced. The black bands of the hindwing vary in width, and the middle ones also in position, the white interspaces are often as much shaded with blackish brown as in *jamaicensis*, from which some Central American specimens are not distinguishable.

♂. Dentate lobe of harpe broad (Pl. XXXVI. f. 4) ; but in one of our Orizaba individuals (f. 6) it is as narrow as in the South American *paphus*.

Larva : the side-bands bordered by a row of black transverse dots. Mexican specimens not described ; ? if identical with North American.

Hab. Canada (rarely, straggler) to Honduras, westward to the Pacific.

Boisduval's *lycopersici* is based on specimens from California with the white markings of the forewing prominent. Our Californian examples are not different from most of the eastern individuals.

In the Tring Museum a series of larvae and pupae, and 50 odd specimens from Canada, the United States, Mexico.

d. P. sexta paphus.

Merian, *Ins. Surin.* t. 57 (1705) (*l., p., i.*).

Sphinx paphus Cramer, *Pap. Ex.* iii. p. 39 t. 216. f. B (1779) (Surinam) ; Goeze, *Ent. Beytr.* iii. 2. p. 226. n. 82 (1780) ; Boisd., *Cons. Lép. Guatemala* p. 74 (1870) ; id., *Spec. Gén. Lép. Hét.* i. p. 72. n. 3 (1875) (Guiana) ; Möschl., *Verh. Zool. Bot. Ges. Wien.* xxvi. p. 346 (1876) (Surinam) ; Burm., *Descr. Rép. Arg.* v. p. 319. n. 1 (1878) (partim ; larva).

Phlegethontius paphus, Hübner, *Verz. bek. Schm.* p. 140. n. 1504 (1822) ; Kirby, *Cat. Lep. Het.* i p. 689. n. 30 (1892) ; Bönningh., *Iris* xii. p. 110. n. 3 (1899) (Rio de Jan.).

Sphinx cestri (!), Boisduval, *l.c.* p. 72. n. 4 (1875) (partim ; Paraguay).
**Sphinx nicotianae* id., *l.c.* p. 75. n. 7 (1875) (Colombia ; -coll. Charles Oberthür).
**Sphinx tabaci* id., *l.c.* p. 78. n. 10 (1875) (partim ; Paraguay ;—coll. Charles Oberthür).
**Protoparce griseata* Butler, *Proc. Zool. Soc. Lond.* p. 259 (1875) (Venezuela ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 608. n. 14. (1877).
Protoparce paphus, Butler, *l.c.* ix. p. 608. n. 13 (1877) ; Druce, *Biol. Centr. Am., Lep. Het.* i. p. 21. n. 5 (1883) (Panama ; Guiana) ; Kaye, *Trans. Ent. Soc. Lond.* p. 139 (1901) (Trinidad).
Protoparce carolina, Druce, *l.c.* p. 21. n. 3 (1883) (partim) ; id., *l.c. Suppl.* p. 315 (1896) ; Pitt. & Bioll., *Lep. Het. Costa Rica* p. 12 (1897).
Protoparce jamaicensis, Druce, *l.c.* p. 21. n. 4 (1883) (partim ; Chiriqui, Panama) ; id., *l.c. Suppl.* p. 315 (1896) ; Pitt. & Bioll., *l.c.* (1897) (San José)
Phlegethontius sexta, Kirby, *l.c.* p. 688. n. 13 (1892) (partim).
Phlegethontius nicotianae, id., *l.c.* p. 689. n. 24 (1892) (Colombia).
Phlegethontius griseata, id., *l.c.* n. 26 (1892) (Venezuela).
Protoparce nicotianae, Schaus, *Ent. News* vi. p. 142 (1895) (= *jamaicensis*).
Phlegethontius carolina, Bönninghausen, *l.c.* p. 111 (1899) (Rio Grande do Sul).

♂♀. White submarginal line of forewing less prominent than in the preceding form ; white bands of hind purer white. Ground colour of forewing variable, sometimes as pale as in *caestri*. Size also obviously variable.

♂. Dentate lobe of harpe narrow (Pl. XXXVI. f. 5).

Larva without lines of black dots.

Bönninghausen, *l.c.*, remarks that the North American *carolina* does not occur in tropical South America, but is found again in Rio Grande do Sul ; he records, however, *paphus* from Rio de Janeiro, which is the same species. Such apparent anomalies in the distribution of species as the one mentioned by Bönninghausen disappear in most cases on closer examination, not being founded on fact, but on the mistaken identity or specific distinctness, as the case may be, of geographical races of the same species.

Hab. Costa Rica to Argentina.

In the Tring Museum 80 odd specimens from various places, also a series of caterpillars.

d. P. sexta caestri.

Sphinx caestri Blanchard, in Gay, *Hist. Chili.* vii. p. 52. t. 5. f. 9 (1854) (*fig. mala* ; Chile).
Sphinx curylochus Philippi, *Linn. Entom.* xiv. p. 273. n. 13 (1860) (Chile).
Sphinx cestri (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 72. n. 4 (1875) (partim ; Chile).
**Sphinx tabaci* Boisduval, *l.c.* p. 78. n. 10 (1875) (partim ; Chile ;—coll. Charles Oberthür).
Protoparce curylochus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 607. n. 8 (1877) (= *caestri ?*) ; Kirby, *Cat. Lep. Het.* i. p. 688 n. 20 (1892).
Protoparce caestri, Calv.-Bartl., *Cat. Lep. Chile* p. 12 n. 90 (1886) (= *curylochus*) ; Kirby, *l.c.* p. 689 n. 21 (1892).
Protoparce tabaci, Kirby, *l.c.* n. 32 (1892).

♂♀. A small and very pale form. The white submarginal line of the forewing is vestigial or absent, the black discal line rather prominent on the pale ground. The white dorsal dots of the abdomen are conspicuous. Sexual armature as in *paphus*.

Hab. Chile.

A series of 6 ♂♂, 5 ♀♀ in the Tring Museum.

38. Protoparce afflicta.

Sphinx paphus (!), Herrich-Schäffer, *Corresp. Bl.* iii. p. 59 (1865) (Cuba).
Sphinx afflicta Grote, *Proc. Ent. Soc. Philad.* v. p. 71 (1865) (Cuba) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 77. n. 9 (1875) (Cuba ; Haiti).

Syzygia afflicta Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 189 (1865) (Cuba); Kirby, *Cat. Lep. Het.* i. p. 685 (1892) (Cuba).
Macrosila afflicta, Butler, *Trans. Zool. Soc. Lond.* ix. p. 611. n. 1. (1877) (Cuba); Walk., *List Lep. Ins. B. M.* xxxv. p. 1855 (1866) (Cuba); Grote, *l.c.* vi. p. 329 (1867); Gundl., *Cont. Ent. Cubana* p. 213 (1881) (Cuba; larva, pupa).

♂ ♀. A close relative of *sexta*. Antenna long, very stout in ♂. Proportional length of tibiae and tarsi as in *sexta*; first segment of foretarsus with four stout spines externally and a number of small ones, which are more numerous at base; *no* pulvillus.

♂. Sexual armature essentially as in *sexta*, dentate lobe of harpe narrower (Pl. XXXVI. f. 7).

♀. The antevaginal lobe a little broader and shorter than in *sexta*, the oblique ridges on its proximal surface as in *sexta*.

Larva green, with paler green side-bands and two pale dorsal lines; stigmata white.

Hab. Cuba and (according to Boisduval) Haiti; Amazons.

In the Tring Museum from: Cuba, 1 ♂, ex coll. Felder; 1 ♀, ex coll. Felder, probably also from Cuba; Manaos, 1 ♂ (received from Herr Fruhstorfer); no locality, 2 ♂♂, 2 ♀♀ (received from French and German dealers), probably S. American continent; 1 ♂ from Nassau, Bahamas (Sir G. Carter).

It is not possible to say without a better material than we have examined whether the insular and continental specimens exhibit any constant differences.

39. Protoparce quinquemaculatus.

Sphinx quinquemaculatus Haworth, *Lep. Brit.* i. p. 59. n. 3 (1803) (England!); Steph., *Ill. Brit. Ent., Haust.* i. p. 119 (1828) (England; imported).
Phlegethontius celeus Hübner, *Samml. Ex. Schm.* ii. t. 377 (1824?).

♂ ♀. Differs from all the other species of *Protoparce* in the foretibia bearing some spines at the end. Smith, *Trans. Am. Ent. Soc.* xv. p. 164 (1883), makes the erroneous statement that the foretibiae are armed with spinules in *Protoparce carolina* and *rustica*.

♂. Tenth abdominal tergite (Pl. XXVII. f. 23. 24) prismatically compressed, pointed, hooked; sternite similar to that of *Protoparce lucetius*, *hannibal*, *sexta*, etc., elongate, obliquely truncate in side-view, lateral margin turned upwards before apex. Clasper as in *P. sexta* and allies; harpe (Pl. XXXVI. f. 15) with a patch of erect scales, outline nearly as in *P. stuarti* and *ochus*, feebly dentate at distal margin, ventrally produced into a short process. Penis-sheath with an apical tooth (Pl. XXIX. f. 27), the conical tooth pointing dextero-laterad and a little distad.

♀. Vaginal plate large, distal part triangular; a fold or ridge runs from the vaginal aperture towards each side (Pl. XX. f. 6).

Larva similar to that of *P. sexta*, covered with numerous small pale dots, a pale infra-stigmatal, longitudinal, interrupted band, no black transverse lines in the grooves. Very variable in colour, green, brown, black.—Food: *Solanaceae*, especially tomato and potato.

Pupa: tongue-case longer than in *P. sexta*, reaching beyond the tip of the antenna-case, much more arched.

Hab. Nearctic Region, southward to Mexico; Sandwich Islands.

Two subspecies:

a. P. quinquemaculatus blackburni.

**Protoparce blackburni* Butler, *Ent. Mo. Mag.* xvii. p. 6 (1880) (Honolulu ;—Mus. Brit.) ; Blackb., *Ann. Mag. N. H.* (5). vii. p. 319 (1881) (descr. of larva).
Phlegethontius blackburni, Kirby, *Cat. Lep. Het.* i. p. 688. n. 18 (1892).
Sphinx celeus, Meyrick, *Fauna Hawai.* i. 2. p. 193 (1899).

♂ ♀. The series of white triangular postdiscal spots on the upperside of the forewing extending to the costal margin.

Not different in structure from the Nearctic form.

Larva described by Blackburn, *l.c.* ; it agrees apparently perfectly with the Nearctic larva.

Hab. Sandwich Islands : Honolulu, Oahu.

1 ♂ 1 ♀ in the British Museum.

b. P. quinquemaculatus quinquemaculatus.

Sphinx quinquemaculatus Haworth, *l.c.* ; Wood, *Ind. Ent.* p. 246. t. 53. f. 23 (1839) ; Harris, ed. Flint, *Ins. Inj. Veg.* p. 320. f. 142. 143. 144 (1862).
Sphinx carolina Donovan (*non* Linné, 1764), *Brit. Ins.* xi. t. 361 (1806) ; Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 294. n. 2 (1839) (partim).
Phlegethontius celeus Hübner, *l.c.* ; Fern., *Sphing. N. Engl.* p. 33. n. 12 (1886) ; Grote, *Hawk Moths N. Am.* p. 40 (1886) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 46 (1889) (liter. rel. to transf.) ; Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 65 (1892) (larva).
Sphinx quinquemaculata (!), Walker, *List Lep. Ins. B. M.* viii. p. 217. n. 5 (1856) (U. St.) ; Jaeg., *Life N. Am. Ins.* p. 189 (1859) ; Morris, *Cat. Lep. N. Am.* p. 18 (1860) ; Lintn., *Proc. Ent. Soc. Phil.* iii. p. 648 (1864) (larva, pupa) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 163. n. 82 (1865) (Atlantic district !) ; Tenn., *Manual N. Hist.* p. 392. fig. (1867) ; Beth., *Canad. Ent.* i. p. 17 (1869) ; Riley, *Missouri Rept.* i. p. 95. f. 38 (1869) ; Glov., *Rept. U. St. Dept. Agr.* p. 80. fig. (1870) ; Reed, *Rept. En. Soc. Ont.* p. 419. fig. (1871) ; Cook, *Rept. State Board Agr. Mich.* xii. p. 117. fig. (1873) ; Gentry, *Canad. Ent.* vi. p. 88 (1874) (Germantown, Pa., larval var. in autumn) ; Pack., *Comm. Ins.* p. 197. fig. 239 (1874) ; id., *Half-hours with Ins.* p. 205. fig. (1877) ; id., in Hayd., *Rpt.* p. 780. fig. (1877) ; French, *Trans. Dept. Agr. Illin.* xv. p. 169 (1877) ; Beth., *Canad. Ent.* x. p. 218 (1878) ; Ball., *Ins. Lives* p. 95. fig. (1879) ; Beth., *l.c.* xii. p. 101. fig. (1880) (life hist.) ; id., *Rept. Ent. Soc. Ont.* p. 25. fig. (1880) ; Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 104 (1880) ; Reed, *Rept. Ent. Soc. Ont.* xii. p. 65 fig. (1882) ; Lintn., *Papilio* iv. p. 145. n. 3 (1884) (R. Grande, Texas) ; id., *Rept. Massach. Board Agric.* p. 180 (1885) ; Riley, *Insect Life* iii. p. 111 (1891) (remedy against larvae) ; Kent, in Riley, *Insect Life* iii. p. 337 (1891) (Roxie, Mississippi, larva abund.) ; Johnst., *Canad. Ent.* xxx. p. 72 (1898) (Hamilton, Ont. ; common).
Macrosila quinquemaculata, Clemens, *Journ. Ac. Nat. Sci. Philad.* iv. p. 166. n. 60 (1859) (U. St. incl. Calif.) ; id., in Morris, *Syn. N. Am. Lep.* p. 190 (1862) ; Lint., *Ent. Contr.* i. p. 192 (1872) (N. York, ix.) ; Thaxt., *Psyche* i. p. 30 (1874) (Newton, Mass., vii.) ; Worthingt., *Canad. Ent.* x. p. 16 (1878) (Chicago, E. ix.-x.) ; Behr., *Papilio* ii. p. 2 (1882) (California) ; Albright, *Ent. News* vi. p. 145 (1895) (Los Angeles).
Macrosila celeus, Edwards, *Proc. Calif. Ac. N. Sci.* vi. p. 92 (1875) (Calif.).
Protoparce celeus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 607. n. 9 (1877) ; Smith, *Trans. Am. Ent. Soc.* xv. p. 165. t. 8. f. 7. 8. (genit.) (1888) ; Dyar, in Riley, *Insect Life* iii. p. 322 (1891) (N. York, at electr. light) ; Cross, *Ent. News* vii. p. 297 (1896) (N. Hampshire, rare) ; Trum., *Ent. News* viii. p. 27 (1897) (S. Dakota) ; How., *Yearb. U. St. Dep. Agr.* p. 126 (1898).
Macrosila (Sphinx) carolina, Mann, *Psyche* ii. p. 73 (1877) (partim ; descr. of *l.* by Scudder).
Sphinx maculata (!), Grote, *Papilio* iii. p. 110 (1883) (err. typ.).
Phlegethontius quinquemaculata, Beutenmüller, *Bull. Am. Mus. N. H.* vii. p. 297. t. 4. f. 3. (1897) (N. York, 2 broods ; descr. of *l., p. & i.*).

♂ ♀. The series of greyish white postdiscal triangular spots of the upperside of the forewing abbreviated costally.

Hab. United States, from the Atlantic to the Pacific ; Canada ; southward to Mexico.

The larva described in *Psyche* II. p. 73 as *carolina* and generally referred to that species is the larva of *quinquemaculatus*, while the description of the larva named there on p. 75 *Macrosila* (*Sphinx*) *quinquemaculata* fits the larva of *P. sexta* (= *carolina*).

In the Tring Museum several larvae, and 70 odd specimens from various places of the United States and from Mexico.

40. Protoparce dilucida.

Protoparce dilucida Edwards, *Ent. Amer.* iii. p. 89 (1887) (Vera Cruz); Beut., *Bull. Am. Mus. N. H.* viii. p. 170 (1896) ("Jalapa," typ. specim. ex coll. Edwards); Druce, *Biol. Centr. Am., Lep. Het. Suppl.* p. 316. n. 6 (A). t. 68. f. 5 (♂) (1896) (Vera Cruz).

Phlegethontius dilucida, Kirby, *Cat. Lep. Het.* i. p. 688. n. 15 (1892) (Vera Cruz).

**Phlegethontius indistincta* Rothschild, Nov. Zool. i. p. 93 (1894) (Honduras;—Mus. Tring); Druce *l.c.* n. 6 (B) (1896).

♂ ♀. Antenna long and, in ♂, thick in comparison to the size of the species. First segment of foretarsus externally with four very strong spines and a few smaller ones; long spur of terminal pair of hindtibia three-quarters the length of the first tarsal segment. The number of yellow lateral patches to the abdomen not constant, there being normally 4 such spots, seldom 3 only. *No* pulvillus.

♂. Tenth tergite of the general form of that of the allied species, more compressed, distinctly raised mesially; the lateral edge of the sternite turned upward close to the apex. Clasper elongate sole-shaped, dorso-apical margin bent inward; harpe peculiar, having only a single process, which is rounded at end and dentate at the upper margin (Pl. XXXVI. f. 8). Tooth of penis-sheath long, apical, distinctly turned upward, nearly as in *muscosa*.

♀. Eighth abdominal tergite mesially concave, appearing sinuate apically, with the stronger chitinised sides somewhat prominent. Antevaginal lobe long, triangular, apex rounded, oblique basal ridges continuous mesially, not high, standing almost at right angles to one another, the point of the angle being, however, strongly rounded.

Larva and chrysalis unknown.

Hab. Mexico to Honduras.

In the Tring Museum 16 ♂♂, 3 ♀♀ from: Cordoba, Mexico; Brit. Honduras; Honduras.

41. Protoparce lucetius.

Sphinx lucetius Stoll, in Cram., *Pap. Ex.* iv. p. 21. t. 301. f. B. (1780) (Surinam); Walk., *List Lep. Ins. B. M.* viii. p. 221. n. 14 (1856) (Brazil); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 346 (1876) (Surinam; *haec spec.?*); Boisd., *Spec. Gén. Lép. Hét.* i. p. 74. n. 6 (1875) (partim? Brazil; Cayenne); Burm., *Descr. Rép. Argent. V. Atlas* p. 57 (1879) (Buenos Ayres).

Phlegethontius lucetius, Hübner, *Verz. bek. Schm.* p. 140. n. 1501 (1822); Kirby, *Cat. Lep. Het.* i. p. 689. n. 31 (1892) (S. Am.).

Sphinx hannibal, Burmeister (*non* Cramer, 1779), *Sphing. Bras.* p. 68. n. 6 (1856) (Rio de Janeiro; partim).

Protoparce lucetius, Butler, *Trans. Zool. Soc. Lond.* ix. p. 608. n. 17 (1877) (Brazil).

Sphinx lutetius (!), Burmeister), *Descr. Rép. Argent.* v. p. 320 (1878) (= ♀ *hannibal* ex err.).

Phlegetontius (!) *contracta* (?), Peters, *Illustr. Zeitschr. Ent.* iii. Heft. 22. t. 1. f. 8. 8*a* (1898).

♂ ♀. The slaty black sericeous patches on the upperside of the forewing are very pronounced and form, together with a patch in the cell, a large semicircle

filled up with black scaling; this area contrasts in many specimens strongly with the paler, russet, basal and distal areas. The discal and postdiscal lines are, near R^3, less curved than in *petuniae*, but more so than in *sexta*. The white dots of the fringe encroach sometimes on the wing, being slightly enlarged basad; they are often barely indicated and sometimes quite absent. Antenna obviously slenderer than in *sexta*, slightly thinner than in *petuniae*. First segment of foretarsus, as in *petuniae*, with four long and several small spines exteriorly. *No* pulvillus.

♂. Tenth abdominal tergite rather broad, flattened above before the convex end, which is hooked and pointed, and here somewhat rounded-dilated laterally; sternite rounded at end, similar in shape to that of *petuniae*, but the turned-up portion of the lateral margin more proximal, the narrowed apex therefore longer. Clasper rather broadly sole-shaped, ventral margin strongly oblique in distal half; harpe (Pl. XXXIX. f. 3. 4): ventral process rather obviously hooked, the tip curving basad; dentate process large, extending to near, or even a little beyond, dorsal edge of clasper, sickle-shaped, twisted at the end, this narrowed end-part not constant in size and dentition. Tooth of penis-sheath triangular, horizontal, rather shorter than in *petuniae*.

♀. Eighth abdominal tergite not sinuate, mesially not obviously impressed; sides more strongly chitinised than disc. Vaginal armature similar to that of *occulta*, but the antevaginal lobe shorter.

Larva: with six side-bands according to Peter's figure (*l.c.*); correct? this species?

Pupa: tongue-case recurved, its end resting against the underside of the sheath near the base (Peters, *l.c.*).

Boisduval's description of the larva and pupa, *l.c.*, does not agree with Peter's figures.

Hab. Costa Rica to Buenos Ayres.

Two subspecies:

a. P. lucetius nubila subsp. nov.

♂ ♀. Forewing more elongate than in the following subspecies, basal and discal areas much less russet, the black postdiscal line less curved; brown bands of the underside of the hindwing feebler marked.

♂. End of tenth abdominal tergite a little less convex and less hooked. Clasper shorter, ventro-distally more oblique; harpe much nearer the end of the clasper (Pl. XXXIX. f. 3), the dentate lobe more strongly rounded, and apically narrower.

♀. Vaginal armature: antevaginal lobe short (not sinuate), the oblique proximal ridges strongly turned frontad, almost in a plane with the lobe (Pl. XX. f. 5).

Larva and pupa not known.

Length of forewing: ♂, 40 mm.; ♀, 43 to 44 mm.

Hab. Costa Rica, 1 ♂, 2 ♀♀. We have some doubts about the correctness of the locality.

The difference in the length of the clasper and in the position of the harpe between this and the following form is very remarkable; as we have only one individual of the ♂ sex, we do not know whether the difference is constant.

b. P. lucetius lucetius.

Sphinx lucetius Stoll, *l.c.*
**Protoparce contracta* Butler, *Proc. Zool. Soc. Lond.* p. 12 (1875) (Rio de Jan. ;—Mus. Brit.).
Phlegethontius contracta (?), Bönninghausen, *Iris* xii. p. 111. n. 6 (1898) (Petropolis).
**Sphinx panaquire* Berg, *An. Soc. Cient. Argent.* xix. p. 266. n. 1 (1885) (Salta ; Catamarca ; Mus. Buenos Ayres).
Phlegethontius panaquire (!), Kirby, *Cat. Lep. Het.* i. p. 689. n. 25 (1892) (" Buenos Ayres " *ex err.*).

♂ ♀. This form varies obviously in size and colour. The forewing is in some specimens more elongate than in others; the marginal dots are liable to obliteration: the base and disc are not seldom strongly washed with russet, in which case the medio-costal black area is very prominent. The abdominal tergites are occasionally edged with white. In three of our ♂♂ from S. Brazil the harpe extends a little beyond the dorsal edge of the clasper, while in a fourth it reaches just to the edge.

We have only one ♀ from Cayenne; it is apparently slightly faded ; its forewing is greyer in tone than in the southern specimens. Still more greyish olive are two *males* (our only ones) from Chanchamayo, Peru ; in these the white fringe-dots are very conspicuous, the harpe is rather narrower and at the apex not twisted. There is possibly a northern and a southern subspecies in South America.

In a large ♀ from Argentina—no special locality is given—with black fringe to the forewing, the black antemedian line of the hindwing is connected with the double discal line only along (SM^1) ; another ♀, from Buenos Ayres, has the forewing much suffused with black ; a specimen from Minas Geraës has no fringe-spots, which are also absent in the specimens described as *panaquire* from Salta.

As the insect is not rare in southern Brazil it should not be difficult to find out whether Peter's figures of the larva and pupa are correct.

Hab. Surinam ; Peru ; Brazil ; Argentina.

In the Tring Museum 11 ♂♂, 13 ♀♀ from : Chanchamayo, Peru ; Cayenne ; Minas Geraës, February (Kennedy) ; Nova Friburgo ; Santa Catherina ; Sao Paulo ; Buenos Ayres ; Salta, N.W. Argentina.

Besides the before-mentioned Salta specimen which we received from the author of *panaquire*, Dr. Berg sent us for comparison a "type" specimen of *panaquire*. We do not find these individuals different from some of our *lucetius* specimens from Brazil.

42. Protoparce petuniae.

**Sphinx petuniae* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 73. n. 5. t. 5. f. 2 (1895) (Brazil ;—coll. Charles Oberthür).

Stoll's rough figure of *lucetius* bears some resemblance to this species, but represents undoubtedly the preceding insect named *contracta* by Butler. Boisduval (*l.c.*) described under *lucetius* both the present species and *lucetius*, we believe, while he considered the form from the Province of Rio de Janeiro as distinct, naming it *petuniae* ; the Argentinian subspecies, which is the most easily recognisable one, he treated as a variety of *petuniae*, and again as a separate species under the name of *cestri*. Other authors have scarcely been more successful in dealing with the present species and its relatives, and that is not to be wondered at, since these species do not exhibit very striking external differences.

♂ ♀. Antenna shorter and slenderer than in *sexta*. Discal and postdiscal lines of upperside of forewing rather strongly angled near R^3, much less evenly curved than in *sexta* ; the black and the buffish white spots of the fringe nearly equal

in size. Abdomen without distinct white geminate dorsal dots. Armature of foretarsus similar to that of *afflicta*. *No* pulvillus.

♂. Tenth tergite pointed, not sinuate ; sternite (Pl. XXVII. f. 19. 20) obtusely pointed, lateral margins curved upward, obliquely truncate distally. Clasper elongate sole-shaped, distal portion of dorsal margin dilated and curved inward ; harpe with a ventral, acute, rather long, conical process ; the dentate lobe individually variable, dorsally truncate, distal angle acute or rounded, dentition often vestigial (Pl. XXXIX. f. 6. 7). Penis-sheath with a single apical tooth, which is almost horizontal, pointing very feebly distad (Pl. XXIX. f. 24).

♀. Eighth tergite of abdomen truncate with the angles rounded, mesially with a triangular impression. Antevaginal lobe (Pl. XX. f. 4) broad, transverse, apical margin slightly, and angles strongly rounded, structure of surface variable ; oblique ridges low, widely separate proximally (Pl. XX. f. 4). Plate of seventh sternite obviously sinuate at apex.

Larva green, with seven white oblique bands which extend over two segments ; horn little curved, with small granules.

Hab. Neotropical Region.

We distinguish three subspecies :

P. petuniae
- *diffissa* from Argentina and Paragnay.
- *petuniae* from Sta. Catharina to Minas Geraës.
- *tropicalis* from the countries north and east of the province of Minas Geraës as far north as Colombia.

a. P. petuniae diffissa.

Sphinx cestri, Boisduval (*nom* Blanchard, 1854), *Spec. Gén. Lép. Hét.* i. p. 70. n. 4 (1875) (partim) Paraguay) ; Burm., *Descr. Rép. Argent.* v. p. 321. n. 2 (1878) (partim ; Buenos Ayres, Mendoza, Tucuman, Paraguay) ; id., *l.c. Atlas* p. 31. 57. t. 12. f. 5 (*l.*). 11 (*p*). (1879).
Sphinx petuniae var., Boisduval, *l.c.* p. 74. sub n. 5. t. 5. f. 2 (♀) (1875) (Buenos Ayres).
**Sphinx diffissa* Butler, *Proc. Zool. Soc. Lond.* p. 82 (1871) (Buenos Ayres).
Protoparce diffissa id., *Trans. Zool. Soc. Lond.* ix. p. 607. n. 7. (1877) (Buenos Ayres).
Phlegethontius diffissa, Kirby, *Cat. Lep. Het.* i. p. 689. n. 22 (1892) (Buenos Ayres).
Protoparce diffusa (!), Druce, *Biol. Centr. Amer. Lep. Het. Suppl.* p. 315 (1896) (diff. from *petuniae*).

♂♀. A small pale southern form. The black postdiscal line of the forewing strongly marked, while the white submarginal zigzag line is not prominent, being generally barely indicated ; the lines are sometimes all obsolescent, except the black postdiscal one.

Larva with 7 white lateral bands ; stigmata white, three blue dots near each.

Hab. Argentina, common as larva on *Cestrum* ; Paraguay.

In the Tring Museum 8 ♂♂, 8 ♀♀ from Argentina.

b. P. petuniae petuniae.

**Sphinx petuniae* Boisduval, *l.c.* n. 5 (1875) (Rio de Janeiro ;—coll. Charles Oberthür).
Phlegethontius diffissa, Kirby, *l.c.* p. 689. n. 22 (1892) (partim).
Phlegetontius (!) *petuniae* (?), Peters, *Illust. Zeitschr. Ent.* iii. Heft. 22. t. 1. f. 6 (1898) (larva).
Phlegetontius (!) *petuniae*, Bönninghausen, *Iris* xii. p. 110. n. 4 (1898) (Rio de Janeiro).

♂♀. The forewing on the whole more russet than in the tropical form ; the ground colour variable, there occurring darker and paler specimens.

Larva : according to Peters' figure with 7 side-bands which have dark (red) borders (correct ?).

Hab. Southern Brazil as far north as the province of Minas Geraës.

In the Tring Museum 5 ♂♂, 12 ♀♀ from : Santa Catharina ; Rio de Janeiro ; Minas Geraës, February (Kennedy).

c. P. petuniae tropicalis subsp. nov.

Phlegethontius lucetius, Rothschild (*non* Cramer, 1780), Nov. Zool. i. p. 541 (1894) (Aroa).

♂♀. The common tropical form differs from typical *petuniae* in having a darker —less yellowish—forewing. The ground colour of the forewing is, however, variable, some individuals being decidedly more russet than others, though not so pale as *pet. petuniae*. The anterior part of the disc of the forewing is sometimes rather black, contrasting with the paler basal and posterior region.

Larva and pupa not described.

Hab. Tropical South America from Minas Geraës to Colombia ; not in the Central and Pacific parts of the Andes, except Ecuador and Colombia.

In the Tring Museum 45 specimens from : Brit. Guiana (*type* ♂) ; Venezuela ; Colombia ; Ecuador.

43. **Protoparce occulta** sp. nov.

Protoparce lucetius, Druce (*non* Cramer, 1780), *Biol. Centr. Amer., Lep. Het.* i. p. 21. n. 6 (1883) (partim ; Chiriqui) ; id., *l.c. Suppl.* p. 315 (1896) (Orizaba ; Cordova ; Jalapa ; Guatemala ; Costa Rica) ; Pitt. & Bioll., *Lep. Het. Costa Rica* p. 12 (1897).

Protoparce petuniae, Druce (*non* Boisduval, 1875), *l.c. Suppl.* p. 315 (1896) (partim ; Jalapa).

♂♀. A very puzzling species, which we cannot distinguish from *P. petuniae tropicalis* except by the sexual organs. There is nothing constant in the pattern and colour of the wings and body by which the two insects can be separated. The only difference which we can find is the *slightly* greater width of the wings in *occulta*. In a good many specimens of *occulta* the brownish black bands on the underside of the hindwing are farther apart anteriorly than in *petuniae tropicalis*, but this character is quite variable.

♂. Tenth tergite obviously broader than in *petuniae*, the sternite slenderer, with the lateral margin less turned upwards. Harpe (Pl. XXXIX. f. 2) similar in shape to that of *lucetius*, *hannibal* and others ; ventral finger-like process short, more or less rough with notches and teeth at the dorsal edge ; dentate lobe sickle-shaped, large, dorsal edge doubled at apex ; there are some granules and teeth on the surface of the lobe near the upper edge ; the lobe is somewhat twisted apically, being here almost vertical to the surface of the clasper ; the dentate end is much broader when looked at from the ventral side than it appears to be in the figure. Tooth of penis-sheath rather broader than in *petuniae*.

♀. Eighth tergite truncate, angles rounded, sides strongly chitinised, the less chitinised middle part impressed in dry specimen, this groove with almost parallel sides, not triangular as in *petuniae*. Antevaginal lobe triangular, rounded at end or feebly sinuate, surface variable in structure, but as a rule mesially carinate (Pl. XX. f. 3) ; oblique ridges (*r*) high, forming a slanting roof over a deep transverse groove which lies proximally of them ; at the proximal side of this groove there is at each side a smooth, concave, transverse plate (*a*) which is rounded mesially ; this plate is not present in *petuniae*, the proximal part of the armature being membranous and much wrinkled in that species.

Larva (from Mexico) in size similar to that of *P. sexta*. Entirely bright green ; a few small yellow excrescences on segments 2, 3 and 4. Seven white

side-bands, the first beginning on fifth segment; the bands not extending on to the following segments, except in an indistinct greenish colour; they are above very indistinctly edged with purplish green; the seventh band extends to the horn, which is rather long, green, very rough, with the excrescences slightly reddish (Schaus *in litt.*).

Hab. Central America only, from Mexico to Panama, where it replaces *petuniae*.

In the Tring Museum 50 specimens from Central America: Mexico (*type*: Orizaba); Honduras; Costa Rica.

We cannot regard this insect as a subspecies of *petuniae*, considering that the sexual organs of the other species of *Protoparce* do not vary geographically to any extent, and that the southern form *diffissa* of *petuniae* does not differ in those organs from the other two subspecies, though the difference of colour is very marked in *diffissa*.

44. Protoparce hannibal.

Sphinx hannibal Cramer, *Pap. Ex.* iii. p. 39. t. 216. f. A (1779) (Surinam); Goeze, *Ent. Beytr.* iii. 2. p. 225. n. 81 (1780); Burm., *Sphing. Bras.* p. 68. n. 6. (1856) (partim) Walk., *List Lep. Ins. B. M.* viii. p. 220. n. 13 (1856) (Brazil); Boisd., *Spec. Gén. Lép. Hét.* i. p. 78. n. 11 (1875) (Brazil; Cayenne); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 346 (1876) (Surinam); Burm., *Descr. Rép. Argent.* v. p. 320. note (1878) (*lutetius* (!) = ♀ *hannibal* ex err.).

Phlegethontius hannibal, Hübner, *Verz. bek. Schm.* p. 140. n. 1502 (1822); Kirby, *Cat. Lep. Het.* i. p. 689. n. 33 (1892); Rothsch., Nov. Zool. i. p. 65 (1894) ("type of *hannibal* in Mus. Tring" ex err.).

**Sphinx hamilcar* Boisduval, *l.c.* p. 79. n. 12 (1875) (N. Friburgo;—coll. Charles Oberthür).

Protoparce hannibal, Butler, *Trans. Zool. Soc. Lond.* ix. p. 605. n. 2 (1877) (Brazil); Schaus, *Ent. News* vi. p. 143 (1895) (=*hamilcar*).

Phlegetontius (!) *hannibal*, Bönninghausen, *Iris*, xii. p. 110. n. 2 (1899) (Rio de Janeiro).

♂♀. The most easily recognised species of the group, though it is closely allied to *pellenia*. Antennae thinner than in *pellenia* and shorter. Long spines of first segment of foretarsus not stout, numerous small spines dorsally of them. The whitish subbasal band of the hindwing is more or less obviously interrupted, and there is, near the anal angle, a dirty white patch, generally rather large, within the black central band. No pulvillus.

♂. Tenth tergite of abdomen somewhat slenderer than in *scutata* and *pellenia*; the sternite (Pl. XXVII. f. 17. 18) also longer. Ventral process of harpe (Pl. XXXIX. f. 1) rather short, horizontal, curved, pointed; dentate lobe sickle-shaped, its distal margin strongly curved; apex less broad than in *lucetius*. Tooth of penis-sheath (Pl. XXIX. f. 23) less distal than in the other species, broad but not prominent, lying close upon the penis-sheath, sometimes only the short acute point projecting free; apical edge of penis-sheath rounded dorsally.

♀. Genital armature similar to that of *scutata*, antevaginal plate smaller.

Larva undescribed; mentioned by Bönninghausen (*l.c.*) as being common on *Solanaceae*, especially on a shrub called "trombeta," on account of its large trumpet-shaped flowers. Chrysalis undescribed.

Hab. South America, from Panama to Santa Catharina. Not observed further north in Central America.

In the Tring Museum 7 ♂♂, 11 ♀♀ from: Chiriqui; Rio Dagua, Colombia; Aroa, Venezuela; Cayenne; Amazons (Bates); Trinidad; Santa Catharina.

The specimens from Chiriqui were sent to us by Messrs. Staudinger and Bang-Haas.

45. **Protoparce leucoptera** spec. nov. (Pl. XI. f. 2, ♀).

♀. Antenna very slender, faintly incrassate distally, scaling white. Body whitish grey, mixed with brown, sides of palpus near eye, a dorso-lateral patch on metanotum and first abdominal segment, bases of apical edges of abdominal tergites on sides, brown; white dorso-lateral dots of abdomen widely separate (not distinct in our unique individual); five large yellow side-patches to abdomen, gradually decreasing in diameter, a trace of a sixth spot on seventh segment; posterior ventral angles of tergites white; abdomen below with traces of brown mesial spots. First segment of protarsus about as long as segments 2 and 3 together, with a few short spines at base, and three long ones, situated at base, in middle and at end respectively. No pulvillus.

Wings, *upperside*.——Forewing: greyish white; a white stigma; submarginal area shaded with brown; a brown postdiscal undulate line, an oblique black apical line, and rather indistinct brown submarginal halfmoons; fringe not well preserved, apparently the white spots smaller than the brown portions.——Hindwing: grey, shaded with brown, marginal area brown, a blackish, irregular, postdiscal band; between it and base four indistinct bands or lines, the most proximal broadest, situated between base and M^2.

Underside drab grey.——Forewing: disc slightly paler; grey marginal spots; a thin oblique brown apical line; scaling in front of this line grey; scattered grey scaling also along outer margin.——Hindwing: paler grey, especially a broad ill-defined discal band-like space and abdominal area; distal marginal area brown, especially in submarginal area; a faint brown band between this border and cell.

Length of forewing: ♀, 45 mm.

Hab. Chatham I., Galapagos Is., 14. iii. '01 (Beck).

1 ♀ in the Tring Museum.*

Allied to *petuniae* and *sexta*.

The dorsum of the thorax is mutilated in the specimen.

46. **Protoparce pellenia.**

**Chaerocampa pellenia* Herrich-Sch., *Ausl. Schm.* p. 50. f. 103 (1854) ("Am. aquin."; — coll. Staudinger).

Sphinx pellenia, Walker, *List Lep. Ins. B. M.* xxxi. p. 36 (1864); Boisd., *Spec. Gén. Lép. Hét.* i. p. 80. n. 13 (1875) (Colombia).

**Sphinx capsici* Boisduval, *l.c.* n. 14. (1875) (Bogota, ♂; — coll. Charles Oberthür).

Protoparce pellenia, Butler, *Trans. Zool. Soc. Lond.* ix. p. 608. n. 16 (1877) ("S. Amer.").

Phlegethontius capsici, Kirby, *Cat. Lep. Het.* i. p. 689. n. 27 (1892) (Bogota).

Phlegethontius pellenia, id., *l.c.* n. 28 (1892) ("S. Amer.").

**Pseudosphinx morelia*, Druce, *Ann. Mag. N. H.* (6). xiii. p. 169 (1894) (Orizaba, ♀; — coll. Druce.)

Protoparce capsici, Schaus, *Ent. News* vi. p. 143 (1895) (= *morelia*); Druce, *Biol. Centr. Amer., Lep. Het. Suppl.* p. 315. n. 3 (8). t. 67. f. 4 (♀) (1896) (Orizaba; Jalapa; Bogota).

♂ ♀. The discal black sericeous patches of the forewing above heavy, forming a band which is strongly angled near R^3; the oblique black apical line as well as the posterior portion of the black postdiscal line very heavy, the submarginal zigzag line creamy buff, not white; creamy buff spots of fringe variable in size, sometimes scarcely one-third as wide as the brownish black fringe-spots; interspaces R^3—(SM^1) between discal band and postdiscal line more or less dark russet. Abdomen below shaded with brown scales, especially in ♂. Antenna almost as stout as in *sexta*. First segment of fore-tarsus externally with 4 or 5 moderately long spines and numerous small ones above them. *No* pulvillus.

* See Appendix.

♂. Tenth abdominal segment not essentially different from that of *lucetius*; the tergite broader and the sternite shorter than in *hannibal*. Clasper elongate sole-shaped; dorso-apical margin bent inward; a slightly bent, horizontal, pointed, dentate, ventral process which is about as long as the dentate lobe of the harpe is broad in middle (Pl. XXXVI. f. 2); this dentate lobe curves dorsad, but is not sickle-shaped, resembling in shape somewhat the lobe of the harpe of *dalica*, differing therefore essentially from the sickle-shaped lobe of *hannibal*, *petuniae*, etc. Penis-sheath (Pl. XXIX. f. 25) with a strong, horizontal, apical tooth as in *rustica*. Sexual organs of *type* of *capsici* and *morelia* examined.

♀. Lobe of vaginal plate (Pl. XX. f. 10) strongly rounded in the specimen figured by Druce, *l.c.*, with three transverse folds; the plate sunken proximally, without the projecting edge (*r*) of *lucetius*, *occulta*, and *sexta*, etc.

Larva and chrysalis unknown.

Hab. Panama; Colombia; Mexico.

The *type* of *pellenia* is in the Staudinger collection. It is a small *female* belonging, in our opinion, to this species. We had no permission to examine the genital armature of the same. The specimen is labelled "Amaquin," which is doubtless meant for "Am. aequin."

In the Tring Museum 8 ♂♂ from: Huatuxco, Vera Cruz; Chiriqui; Rio Dagua, Colombia (Rosenberg); Cauca, Juntas, Colombia (M. de Mathan).

A long series in coll. Charles Oberthür from Cauca, Juntas (M. de Mathan).

47. **Protoparce scutata** spec. nov.

(?) *Sphinx pellenea* (!), Möschler (*non* Herr.-Sch., 1854), *Verh. Zool. Bot. Ges. Wien* xxxii. p. 332 (1882) (Surinam).

Phlegethontius pellenia, Rothschild, Nov. Zool. i. p. 541 (1894) (Aroa).

♂♀. Again a puzzling insect. The sexual organs of the ♂ are remarkably different from those of *pellenia* (= *capsici*), but there is scarcely anything in the colour or pattern by which the two insects could constantly be separated. If one has a longer series of specimens side by side from the same country, one notices that *scutata* has the basal and distal areas of the forewing less yellowish, the white bands of the hindwing above less obviously shaded with brown, the forewing on the whole rather more elongate, the black bands of the underside of the hindwing more distinct, and the underside of the abdomen not powdered with brown. But these differences are not prominent and do not hold good, if specimens from various localities are compared. There are *no* intergradations between the two species as regards the sexual organs. The case reminds one of that of *P. occulta* and *P. lucetius tropicalis*; but while these do not occur in the same country, *pellenia* and *scutata* are found in the same localities, in Colombia at least.

♂. Both the tergite and the sternite of the tenth abdominal segment slenderer than in *pellenia*. Dentate lobe of harpe sickle-shaped (Pl. XXXVI. f. 3), broad, apex curved downward, twisted, slender; ventral process horizontal, curved, pointed, not dentate or notched. Penis-sheath resembling that of *hannibal*, the tooth not apical, not horizontal, but pointing somewhat proximad (Pl. XXIX. f. 26).

♀. Eighth abdominal tergite truncate, with the stronger chitinised angles rounded. Antevaginal plate triangular, nearly as in *occulta* (Pl. XX. f. 3), but smaller, mesially subcarinate; transverse basal ridge as in Pl. XX. f. 5, but mesially less rounded.

Early stages not known.

Hab. Venezuela ; Colombia ; Ecuador.

In the Tring Museum 23 ♂♂, 11 ♀♀ from : Merida, Venezuela (Briceno : *type*) ; Aroa, Venezuela ; Chiriqui ; Rio Dagua, Colombia (Rosenberg) ; Paramba, Ecuador (Rosenberg).

A series in coll. Charles Oberthür. Also in other collections, generally mixed up with some other species.

48. **Protoparce tucumana** spec. nov. (Pl. V. f. 6. ♂).

♂. Similar to small specimens of *P. pellenia* and *scutata* ; head, thorax and forewing decidedly paler ; stigma, the pale lines of the forewing, and the fringe almost white, not yellowish. Metanotum white in front. Abdomen above without white dots at the apices of the segments, underside somewhat buffish.——Forewing, above : the black discal patches C—R^3 contiguous, closer to cell than in the allied species ; discal double line outside the black patches sharply angled at R^3, the interspace between the two lines more or less white, these discal lines and the postdiscal one, which is also partly bordered with white, obviously concave between C and R^3, the posterior portion of the postdiscal line, between M^2 and internal margin, sharply defined, continuous, thinner behind, the space inclosed by it whitish.

♂. Tenth abdominal tergite slenderer than in *scutata* ; harpe intermediate between that of *pellenia* and *scutata*, the large dentate lobe more curved than in the former, very much less so than in the latter (Pl. XXXVI. f. 10).

♀. Unknown.

Early stages unknown.

Hab. Tucuman.

1 ♂ (*type*) in Mus. Tring ; another ♂ from Salta in the Museum at Buenos Ayres ; a third from Paraguay in the Musée Royal d'Hist. Nat., Bruxelles ; a fourth in the collection of Herr Neuburger, Berlin.

49. **Protoparce ochus.**

**Sphinx ochus* Klug, *Neue Schm.* i. p. 4. t. 3. f. 2 (1836) (Mexico ;—Mus. Berlin) ; Boisd., *Cons. Lép. Guatemala* p. 74 (1870) (Honduras) ; id., *Spec. Gén. Lép. Hét.* i. p. 82. n. 16 (1875) (Mexico ; Honduras).

Macrosila instita Clemens, *Journ. Ac. Sci. Philad.* (2) iv. p. 164. n. 57 (1859) (Honduras).

Macrosila ochus, Grote, *Proc. Ent. Soc. Philad.* v. p. 68 (1865).

Protoparce ochus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 607. n. 6 (1877) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 20. n. 2 (1883) (Mexico ; Cordova ; Jalapa ; Honduras ; Guatemala ; Costa Rica) ; id., *l.c. Suppl.* p. 314 (1896) (Cuesta de Misantla ; Orizaba ; Tabasco ; Belize ; Costa Rica) ; Pitt. & Bioll., *Lep. Het. Costa Rica* p. 11 (1897) (Irazu) ; Kaye, *Trans. Ent. Soc. Lond.* p. 139 (1901) (Trinidad).

Phlegethontius ochus, Kirby, *Cat. Lep. Het.* i. p. 688. n. 11 (1892) (Mexico ; Honduras) ; Rothsch., Nov. Zool. i. p. 541 (1894) (Aroa).

♂♀. A strange-looking insect on account of the clayish tawny ochraceous colour of the upperside of the forewing and thorax and of the occiput. The palpus is similar in shape to that of *rustica* ; the antenna of the ♀ shows distinct traces of fasciculated ciliae. The first segment of the foretarsus has externally 5 or 6 longer, moderately stout, spines, and a number of smaller ones. Without pulvillus.

♂. Tenth abdominal tergite (Pl. XXVII. f. 13. 14) strongly convex at end, hooked, pointed ; the sternite bent upwards at end, sinuate, the two lobes

pointed. Dorso-apical margin of clasper bent inward ; the dentate upper portion of the harpe not strongly developed dorsad and distad, its margin slanting towards the ventral, curved, horizontal, process (Pl. XXXVII. f. 13). Penis-sheath with long apical tooth, which slants distad as in *muscosa* (Pl. XXIX. f. 30).

♀. Eighth abdominal tergite sinuate or impressed mesially at apex. Antevaginal plate with a rather long triangular lobe, the apex of which is rounded and proximally produced into another, almost similar, lobe or ridge, which points proximad forming the slanting roof of a transverse groove in front of the antevaginal plate.

Larva and chrysalis not known.

Hab. Mexico to Costa Rica : Venezuela ; most likely also in Colombia.

In the Tring Museum 14 ♂♂, 16 ♀♀ from: Mexico ; Honduras ; Aroa, Venezuela.

50. **Protoparce lefeburei.**

Sphinx lefeburei Guérin, *Iconogr. Règne Anim., Ins.* p. 494 (1844) (Bolivia).
**Macrosila incisa* Walker, *List Lep. Ins. B. M.* viii. p. 205. n. 11 (1856) (Rio de Janeiro ;—Mus. Brit.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 605. n. 1 (1877) (Rio de Janeiro) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 20. n. 1 (1883) (Chiriqui).
Sphinx lefebvrei (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 81. n. 15 (1895) (N. Friburgo ; =*incisa* ; " Guérin, *Magaz. de Zool.*" ex err.).
Sphinx lefebvrei (!), Möschler, *Verh. Zool. Bot. Ges. Wien.* xxvi. p. 346 (1876) (=*incisa* ; Surinam).
Macrosila lefebvrei, Kirby, *Cat. Lep. Het.* i. p. 685. n. 1 (1892) (S. Amer.) ; Rothsch., Nov. Zool. i. p. 541 (1894) (Aroa).
Diludia lefebvrei, Bönninghausen, *Iris* xii. p. 112. n. 2 (1899) (Rio de Janeiro).

♂♀. Antenna of ♀ with rather obvious basal rows of prolonged ciliae to the segments. First segment of anterior tarsus externally with 5 or 6 long, but not stout, spines and some moderately long ones near the base. Segment 2 of palpus rather longer than ordinarily in this genus. Pulvillus *present*, long and narrow.

♂. Tenth abdominal tergite long, gradually narrowed to a point, not dilated before end (Pl. XXVII. f. 15) ; sternite also long, deeply divided, the lobes slender, curved upwards, the segment differing in structure obviously from that of all the other species of *Protoparce*. Clasper strongly rounded apically, dorso-apical margin not dilated, not bent inwards ; harpe (Pl. XXXVII. f. 12) similar to that of *petuniae*, the ventral process feebly curved ; the dentate lobe more or less rectangular. Penis-sheath also peculiar in having two small teeth (Pl. XXIX. f. 22).

♀. Eighth abdominal tergite rounded truncate, the sternite (Pl. XX. f. 1) larger than in the other species, more strongly chitinised, rounded apically, with an elongate, prominent, tubercle behind the mouth of the vagina. Antevaginal plate very different from that of the other species of *Protoparce*, being deeply rounded-sinuate.

Larva and chrysalis unknown.

Hab. Mexico to Southern Brazil.

Mexican specimens are more russet, especially on the underside. In the collection of Mons. Charles Oberthür there is an individual from Guérin's collection ; it is labelled N. Friburgo ; the type was said (erroneously ?) to be from Bolivia.

In the Tring Museum 8 ♂♂, 7 ♀♀ from : San Pedro Sula, Honduras (Witkugel) ; Rio Dagua, Colombia (Rosenberg) ; Aroa, Venezuela ; Rio de Janeiro ; Bahuru, Sao Paulo (Dr. Hempel) ; Paraguay.

51. Protoparce stuarti.

**Phlegethontius stuarti* Rothschild, Nov. Zool. iii. p. 22. n. 2. t. 13. f. 8. (1896) (La Paz, October ;— Mus. Tring).

♂ ♀. A conspicuously coloured insect, which differs remarkably from the other members of the genus both in pattern and structure. While the yellow abdominal patches disappear elsewhere in the genus in a disto-proximal direction, the distal patches being the first to obliterate, the second abdominal segment is in *stuarti* without a yellow patch, though the other patches are well marked, with their colour intensified. The grey, almost lavender, colour of the frons contrasts strongly with the yellowish cream colour of the palpi, which are deep black at the dorsal margin. The second palpal segment is rather slender, its scaling being a little shorter than that of the first segment. Eyes comparatively smaller than in *sexta*. Foretarsus with very long strong spines : first segment shorter than the tibia, with three long spines and one to four additional, shorter, basal ones, without any small spines externally, segments 2 to 4 with a single long apical spine externally ; mid- and hindtarsi short, segments 1 and 2 together as long as the respective tibiae. Spines at edges of abdominal tergites very weak, *no spines* on the sternites ! Discocellulars of hindwing straight, or R^2 faintly curved, not or slightly oblique, R^2 at right angles to SC^2, while the lower angle of the cell is obtuse ; SC^2 and R^1 on a rather long stalk. *No* pulvillus.

♂. Antenna peculiar : basal segment without rows of prolonged ciliae, middle and distal segments less impressed and less triangularly compressed than in the other species of *Protoparce* ; hook short. Tenth tergite almost gradually narrowed to end, very faintly dilated before end, pointed ; lobe of sternite long, sides nearly parallel, apex rounded, with an indication of a sinus, upperside slightly concave. Clasper broadly rounded at end, dorsal margin feebly curved inward ; harpe short, triangular, dorsal margin not distinctly dentate (Pl. XXXVI. f. 1). Tooth of penis-sheath long, slightly pointing distad, not quite so much as in *muscosa*.

♀. Antenna less slender than in the allied species, less setiform, being thickest beyond middle, no combs of ciliae. Plate of seventh abdominal sternite broad, truncate, angles rounded. Antevaginal lobe short, triangular, apex rounded, no prominent transverse ridge proximally at its base.

Larva and chrysalis not known.

Hab. Bolivia, found at La Paz in some numbers at the electric light.

In the Tring Museum 38 specimens from La Paz.

52. Protoparce manducoides.

**Phlegethontius manducoides* Rothschild, *Iris* vii. p. 302. t. 6. f. 2 (♂) (1894) (Chiquitos, Bolivia ;— coll. Staudinger).

♂ ♀. Second segment of palpus rather long, with buffish white tip. Pulvillus present. First segment of foretarsus with three long spines, second with one long apical one, without short external spines. Abdomen with three yellow side-patches. Underside of body, or only breast, flushed with pink. Forewing resembling somewhat that of *rustica* ; stigma larger, marginal dots smaller, white scaling more restricted, especially in outer half, where there is a conspicuous buffish white discal band, while the area outside it is black, except traces of a white submarginal line. Hindwing very different, being greyish white, with a black distal border and two black discal bands between it and cell.

Underside greyish brown, more grey on hindwing, especially towards abdominal margin; no distinct bands.

Not dissected.

Hab. South America: Bolivia; Brazil.

In coll. Staudinger 1 ♂ from Chiquitos, Bolivia, and 1 ♀ from Sao Paulo. In the Vienna Museum 1 ♀ from Brazil (Natterer).

53. Protoparce rustica.

Sphinx rustica Fabricius, *Syst. Ent.* p. 540. n. 15 (1775) (America).

♂ ♀. Antennae long and, in ♂, thick. Second segment of palpus not much longer than broad, very much shorter than the first. First segment of foretarsus with an outer row of spines of which the apical one is prolonged, some spines at the base above this row, segments 2 to 4 with one prolonged apical spine and a very few short ones externally. First segment of midtarsus see Pl. LXIV. f. 7.

♂. Tenth tergite of abdomen (Pl. XXVII. f. 11) convex and somewhat dilated before end, hooked, apex sinuate (Pl. XXVII. f. 12); sternite concave above, apical margin bent upward, rounded. Clasper narrowed to end, dorso-apical margin strongly bent inward; harpe peculiar, having a single, long, slightly dentate, ventral process (Pl. XXXVII. f. 15); there is no tuft of scales on the surface of the harpe near the base of the process, as in the other species. Penis-sheath armed with an apical tooth (Pl. XXIX. f. 21).

♀. Eighth tergite of abdomen sinuate; antevaginal plate (Pl. XIX. f. 11. 12) with a long mesial lobe, which is sinuate, the transverse oblique ridge at its base not prominent. Plate of seventh sternite short, rounded.

Larva finely granulated, with seven side-bands, which are white and bordered green in front.—Food: *Chionanthus*, *Bignonia*, etc.

Chrysalis with a long free tongue-case which is not recurved.

Hab. New York to Buenos Ayres, Antilles, and Galapagos Islands.

Three subspecies:

a. P. rustica rustica.

Merian, *Ins. Surinam* t. 5 (1705) (imago; larva & pupa=*Ps. tetrio*).

Sphinx rustica Fabricius, *Syst. Ent.* p. 540. n. 15 (1775) (America); Sulz., *Gesch. Ins.* p. 151. t 20. f. 2 (1776) (America); Goeze, *Ent. Beytr.* iii. 2. p. 206. n. 10 (1780); Stoll, in Cram., *Pap. Ex.* iv. p. 21. t. 301. f. A (1780) (Surinam); Fabr., *Spec. Ins.* ii. p. 145. n. 28 (1781) (America); id., *Mant. Ins.* ii. p. 95. n. 31 (1787); Gmel., *Syst. Nat.* i. 5. p. 2385. n. 93 (1790) (larva and pupa those of *Ps. tetrio*); Fabr., *Ent. Syst.* iii. 1. p. 366. n. 33 (1793); Ménétr., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 89. n. 1485 (1857) (Haiti; Brasilia); Herr.-Sch., *Corresp. Bl.* iii. p. 59 (1865) (Cuba); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 68 (1865) (Cuba); Boisd., *Spec. Gén. Lép. Hét.* i. p. 82. n. 17 (1875); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 346 (1876) (Surinam); Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico); id., in Wiegm., *Arch. Naturg.* p. 10 (1878) (Cuba; larva); Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O., 1 ♂).

Sphinx chionanthi Abbot & Smith, *Lep. Georgia* i. p. 63. t. 34 (1897) (nom. nov. loco *rustica*); Dunc., in Jard., *Nat. Libr.* xxxvii. p. 101. t. 5. f. 2 (*i.*). t. 6. f. 2 (*l.*) (1841).

Acherontia chionanthi, Hübner, *Verz. bek. Schm.* p. 139. n. 1495 (1822).

Cocytius rustica, id., *l.c.* p. 140. n. 1498 (1822); id., *Samml. Ex. Schm.* iii. t. 38. f. 1. 2 (1806).

Protoparce rustica, Burmeister, *Sphing. Brasilienn* p. 63. n. 1 (1856); Butl., *Trans. Zool. Soc. Lond.* ix. p. 606. n. 1 (1877) (Brazil; Mexico; Haiti); id., *Proc. Zool. Soc. Lond.* p. 484. n. 61 (1878) (Jamaica); Burm., *Descr. Rép. Argent.* v. p. 317 (1878); id., *l.c. Atlas* p. 31. t. 11. f. 7. A-E (1879) (head of larva); Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 20. n. 1 (1883); Smith, *Trans. Amer. Ent. Soc.* xv. p. 168 (1888) (N. York, southward into S. Am.; Texas); Druce, *l.c. Suppl.* p. 314 (1896); Pitt. & Bioll., *Lep. Het. Costa Rica* p. 12 (1897); Smyth,

Ent. News xi. p. 485. t. 10 (*i.*). 11 (*ll., p.*) (1900) (life hist.) ; Kaye, *Trans. Ent. Soc. Lond.* p. 139 (1901) (Trinidad).

Macrosila rustica, Walker, *List Lep. Ins. B. M.* viii. p. 199. n. 2 (1856) (St. Domingo ; Jamaica ; Mexico ; Brazil) ; Clem., *Journ. Ac. N. Sc. Philad.* (2). iv. p. 163. n. 56 (1859) ; Grote, *l.c.* vi. p. 329 (1867) (Cuba) ; id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) ; id., *Bull. Buffalo Soc. N. Sc.* ii. p. 227. n. 52 (1875) ; Gundl., *Contr. Ent. Cubana* p. 268 (1881) (Cuba ; larva, pupa).

Phlegethontius rustica, Grote, *Bull. Buffalo Soc. N. Sc.* iii. p. 224 n. 53 (1877) (Penn. ; Virg. ; South. States) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 45 (1889) (lit. rel. to transf.) ; Kirby, *Cat. Lep. Het.* i. p. 687. n. 1 (1892) ; Rothsch., Nov. Zool. i. p. 541 (1894) (Aroa).

Phlegethontius rusticus, Edwards, *Ent. Amer.* ii. p. 163 (1887) (pupa) ; Beutenm., *Bull. Am. Mus. N. H.* vii. p. 300. t. 4. f. 6 (1895) ; Kirby, in Allen, *Nat. Libr., Moths* iv. p. 43. t. 105 (*l., i.*) (1897).

Clanis phalaris, Kirby, *Cat. Lep. Het.* i. p. 702. n. 1 (1892) (cit. Schaller *ex err.!*).

Phlegetontius (!) *rustica*, Peters, *Illustr. Zeitschr. Ent.* iii. Heft 22. t. 1. f. 5. 5*a*. 5*b*. 5*c* (*l., p.*) (1898) ; Bönningh., *Iris* xii. p. 111. n. 7 (1899) (Rio de Jan. ; larva on Bignonia and Heliotrop).

♂ ♀. The basal and discal areas of the forewing and the hindwing are almost black in fresh specimens, while in faded individuals the forewing becomes more or less pale russet. In one of our Aroa individuals the interspace C—M^2 of the forewing between the antemedian and the discal lines is very pale wood-brown, while the interspace between the first and second discal lines has remained dark brown.

Hab. Continental America, except the North and South, and the larger West Indian islands ; common.

80 odd specimens in the Tring Museum from : Bahamas ; Haiti ; Jamaica ; and various places of the Continent.

b. P. rustica harterti.

Sphinx rustica, Snellen, *Tijdschr. Ent.* xxx. p. 33 (1887) (Curaçao).

**Phlegethontius harterti* Rothschild, Nov. Zool. i. p. 29 (1894) (Bonaire).

♂ ♀. The difference between this and the preceding form is very slight, but constant, the dark, triangular, discal area of the forewing being obviously paler in all the specimens we have seen.

Hab. Curaçao ; Bonaire ; St. Vincent ; St. Lucia ; probably on all the Lesser Antilles.

In the Tring Museum 1 ♂, 4 ♀♀, from : Bonaire (E. Hartert) ; St. Vincent ; St. Lucia ; Barbados.

Also in coll. Staudinger, from Curaçao ; coll. Snellen, from Curaçao ; Mus. Dublin, from Barbados ; and in other collections.

c. P. rustica calapagensis.

Protoparce calapagensis Holland, *Proc. U. St. Nat. Mus.* xii. p. 195 (1889) (Charles I.).

Syzygia calapagensis, Kirby, *Cat. Lep. Het.* i. p. 685. n. 2 (1892) (Galapagos).

♂ ♀. A smaller and paler insect than *rustica rustica*. The tenth abdominal tergite of the ♂ not so distinctly sinuate, and the harpe shorter, than in *rustica rustica*, otherwise the same.

A ♂ from Chatham I. in the Tring Museum is abnormal, having the body above and the wings nearly entirely brownish black, except the double series of dorsal dots on the abdomen, the stigma of the forewing and the marginal spots of both wings, which are white, besides feeble traces of white markings on both wings. The first segment of the palpus is much less extended white than in normal specimens. We call this aberrant individual—

ab. **nigrita** nov.

Hab. Galapagos Islands.

In the Tring Museum 2 ♂♂, 2 ♀♀ from: Chatham I., 14. iii. 1901 (R. H. Beck); Charles I. (Markham).

54. Protoparce albiplaga.

Protoparce rustica, Burmeister (*non* Fabricius, 1775), *Sphing. Bras.* p. 63. n. 1 (1856) (partim ; larva).
**Macrosila albiplaga* Walker, *List Lep. Ins. B. M.* viii. p. 202. n. 7 (1856) (Rio de Janeiro ;—Mus. Brit.).
Diludia albiplaga, Grote & Rob., *Trans. Am. Ent. Soc.* ii. p. 76 (1868) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 614. n. 9 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 682. n. 9 (1892) ; Rothsch., Nov. Zool., i. p. 88. 541 (1894) (Aroa) ; Druce, *Biol. Centr. Am., Lep. Het. Suppl.* p. 318. n. 6 (1896) (Jalapa) ; Peters, *Illustr. Zeitschr. Ent.* iii. Heft. 22. t. 1. f. 3. (*l.*). 3*a* (*p.*) (1898) ; Bönningh., *Iris* xii. p. 112. n. 19. t. 3. f. 5 (*l.*) (1899) (Rio de Jan.).
(?) *Sphinx trojanus* Schaufuss, *Nunq. Otios.* i. p. 15 (1871) (Venezuela).
Sphinx albiplaga, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 84. n. 18 (1875) (Brazil).
Sphinx valida, id., *l.c.* sub syn. (1875) (*nom. nov. superfluum* !).
Amphonyx cluentius, Burmeister, *Descr. Rép. Argent.* v. p. 316. n. 1 (1878) (partim ; larva).
Protoparce albiplaga, id., *l.c. Atlas* p. 33. t. 13. f. 2 (*l.*) (1879).

♂♀. Foretarsus without long and stout spines externally, only the apical spine of the segments being somewhat prolonged. Posterior tibia shorter than first tarsal segment. Pulvillus vestigial. Abdominal spines heavy.

♂. Tenth abdominal tergite rather thick vertically, becoming obviously thinner toward the end, which is pointed and hooked; sternite resembling that of *petuniae*, but broader, the turned up lateral margin higher. Clasper obliquely rounded dorso-apically, ventral margin incrassate, forming a rather prominent angle apically ; harpe with a single, ventral, long, obtuse process, which is somewhat knife-blade-shaped, and sharply toothed ; the end is incrassate, and bears a transverse fold or ridge (Pl. XXXVII. f. 15). Penis-sheath with a long, slightly curved, conical tooth, which is horizontal, pointing very feebly proximad.

♀. Antevaginal plate large, broad, apically rounded, mesially emarginate, rugose, proximal edge not much raised.

Larva with a lateral series of 8 to 10 yellow patches bordered with black ; head and posterior part of anal segment black : there are also thin black transverse bands, one on each segment posteriorly, more or less interrupted dorsally.

Pupa : sheath of tongue short.

Hab. Mexico to Southern Brazil ; not on the West Indian Islands.

In the Tring Museum 6 ♂♂, 7 ♀♀ from : Rio Dagua, Colombia (Rosenberg) ; Aroa, Venezuela ; Rio de Janeiro.

55. Protoparce trimacula spec. nov. (Pl. V. f. 7, ♂).

Allied to *P. dulica* and *albiplaga*.

♂. Antenna long and stout. Second segment of palpus longer than in *lucetius*, *carolina*, *rustica*. First segment of the foretarsus without obviously prolonged spines. With pulvillus. Tenth abdominal tergite compressed, apex rounded, not pointed in dorsal view, but the apical edge sharp, so that the hook appears to be pointed in a side-view (Pl. XXVII. f. 21); lobe of sternite very short, curved upwards, truncate sinuate, with the angles rounded (Pl. XXVII. f. 2, ventral view). Clasper very broad, dorso-apical margin bent inward ; harpe resembling to a certain extent that of *florestan* and allies ; it has no ventral process ; the

ventro-distal margin is turned inward, dentate, and dorsally produced into a long sharp tooth; the thin dorsal edge is irregularly toothed (Pl. XXXVI. f. 11). Penis-sheath with a small subapical tooth (Pl. XXIX. f. 48).

Upperside of body and forewing bistre colour, mottled with grey and tawny olive; head with a creamy white streak above eye, continued to pronotum; mesothoracic tegula with a thin whitish lateral border, along which runs an indistinct blackish brown line; abdomen rather paler, with mesial tufts of suberect scales; a series of white apical dots at each side as in *brontes*, *rustica*, and some others, segments 1 to 3 with a yellow lateral patch bordered with black.——Forewing: outer margin sinuate at M^2, the undulate and zigzag lines well marked, discal and postdiscal ones curved as in *sexta*, interspace SC^4—SC^5 of second and third discal line white, the other anterior interspaces between these two lines, as well as at the distal side of the third one, more or less greyish white, interspaces between first and second discal lines, which are heavy, not sericeous black as in *lucetius*, but scarcely darker than the rest of the disc; postdiscal line heavy, developed to a patch upon R^3 and behind M^2, followed by a large, ill-defined, creamy white patch at R^2; the creamy white submarginal zigzag line heavy, but broken between the veins; creamy white fringe-spots large; stigma nearly white, round; obliqne apical line heavy, bordered with creamy white in front.——Hindwing blackish brown, the pale bands very obscure, being clearly marked only in abdominal fold; fringe spotted with creamy white.

Underside: First and base of second segment of palpus creamy white; breast and femora nearly white, tibiae and tarsi brown ringed with white, abdomen more dirty white, with the usual brown mesial spots.——Wings bistre colour, more mummy brown distally, hindwing greyish white in proximal half of abdominal fold; three darker discal bands, which are very faint on forewing, better marked on hindwing, where they remain parallel down to SM^2.

♀. Unknown.

Length of forewing: ♂, 55—60 mm.

Larva and chrysalis unknown. We expect the larva to differ from the ordinary obliquely striped type, judging from the larva of *albiplaga*.

Hab. Colombia.

In Tring Museum 4 ♂♂ from: R. Dagua (W. Rosenberg) (*type*); Juntas, Cauca (M. de Mathan), end of 1897 to Jan. 1898.

The specimens from the Cauca valley we received from Mons. Ch. Oberthür, who has a fine series of this insect, all males.

56. **Protoparce leucopsila** sp. nov. (Pl. LXV. f. 3. ♂).

♂. Allied to *dalica*, in colour intermediate between it and *rustica*, wings narrower. First segment of foretarsus shorter than the tibia, with three very long external spines. Antenna slender, shorter than in *dalica* and thinner, scaling white at base. Frons with white transverse band connecting the bases of the antenna as in *rustica*; sides of frons and anterior edge with cinnamon scales. White lateral stripe of mesonotum continued over pronotum; collar besides with three buffish white spots. Abdomen above nearly as in *rustica*, three yellow side-patches, two widely separated rows of white dots, a mesial row of rather indistinct black dots, posterior tergites more extended chalky white than in *rustica* and *dalica*. Underside of body chalky white; first segment of palpus (except a stripe along

eye) and a triangular basal spot of segment 2 white ; legs brown above, ringed white. With pulvillus.

Wings, *upperside*.——Forewing midway between those of *dalica* and *rustica* ; a triangular costal space before stigma, interspace between antemedian and first discal line, and the interspace between the third discal and first postdiscal line pale, shaded with buff ; a large apical patch in front of oblique apical line followed by a submarginal patch, both white, a smaller white patch and a submarginal zigzag line before hinder angle ; a black streak between M^1 and M^2 connecting third antemedian line with first discal one ; discal lines sharply dentate, lines 2 and 3 close together, with the interspace between them spotted with white, the lines more evenly curved than in *rustica* ; white spots of fringe large, extended on to the wing-membrane.——Hindwing : as in *dalica*, but the pale distal band more distinct behind and broader.

Underside not essentially different from that of *dalica*.

♂. Tenth tergite strongly compressed, apex rather prominent (Pl. XL. f. 10, side-view); sternite about one-fifth shorter than the tergite, gradually narrowed to the end which is broad and truncate with the angle turned upwards. Clasper with almost straight dorsal margin ; harpe (Pl. XL. f. 7) of the same type as in *trimacula* and *florestan* : a large, almost circular plate, deeply concave, the distal edge dentate and ventrally produced into a short triangular lobe ; inner surface of harpe covered with small elongate scales. Penis-sheath with stout apical process (of which the tip is unfortunately broken), projecting obliquely dextrad and distad.

Length of forewing : 47 mm.

Hab. Chamicuras, Upper Amazons, Peru (Bartlett), 1 ♂ in Mus. Dublin.

57. Protoparce dalica.

**Protoparce dalica* Kirby, *Trans. Ent. Soc. Lond.* p. 243 (1877) ("Canada" *loc. err.* ;—Mus. Dublin); Waterh., *Aid Ident. Ins.* i. t. 70 (1887) ("Canada" *loc. err.*) ; Edw., *Ent. Amer.* iii. p. 223 (1888) ; Weym., *Iris* vii. p. 301. note (1895) (=*garleppi*).

Phlegethontius dalica Kirby, *Cat. Lep. Het.* i. p. 687. n. 2 (1892) ("Canada" *loc. err.*).

**Phlegethontius garleppi* Rothschild, *Iris* vii. p. 307. n. 15. t. 5. f. 1 (1895) (Huayabamba, E. Peru ;—coll. Staudinger).

♂. Easily recognised by the dark purplish brown forewing, which is conspicuously marked with a triangular white patch in front of the large white stigma, and with an irregular subapical patch bordered by the oblique apical line, as well as some basal bands and submarginal spots of the same colour. Antenna long and stout. Head with a white lateral stripe, which is interrupted. First segment of foretarsus externally with three very long spines. Pulvillus present. Tenth abdominal tergite slender, gradually narrowed to the apex, which is truncate, sternite very long, the sides curved upwards, irregularly notched. Clasper broad, rather strongly narrowed to apex, ventral margin strongly oblique, dorso-apical margin bent inward ; harpe with a long, irregularly dentate, lobe, which extends to the dorsal edge of the clasper (Pl. XXXIX. f. 5) ; the most ventral tooth rather heavier ; no ventral process. Penis-sheath with a long apical tooth as in *rustica*, slightly pointing distad.

♀. Unknown.

Larva and chrysalis unknown.

We have now seen several specimens, and find that the differences between *dalica* and *garleppi* are not constant.

Hab. Costa Rica, Peru, and Colombia, doubtless more widely distributed, but rarer than most *Protoparce*.

In the Tring Museum 2 ♂♂ from: Rio Dagua Colombia (W. Rosenberg); Costa Rica.

The locality Canada given by Kirby for *dalica* is erroneous. The specimen came doubtless from Peru, perhaps from the same locality where *leucospila* was found.

2 ♂♂ in coll. Charles Oberthür from: Juntas, Canca, and Honda, Colombia (Mathan).

In coll. Standinger 2 ♂♂ from Peru: Chanchamayo and Huayabamba.

58. Protoparce brontes.

Sphinx brontes Drury, *Illustr. Ex. Ins.* ii. p. 53 & Index, t. 29. f. 4 (1773) (New York *ex err.* !).
Sphinx pamphilius Stoll, in Cram., *Pap. Ex.* iv. p 217. t. 394. f. E. (1782) (Surinam *ex err.*); Grote, *Proc. Ent. Soc. Philad.* v. p. 72 (1865) (=*afflicta* ?).
**Macrosila collaris* Walker, *List Lep. Ins. B. M.* viii. p. 201. n. 5 (1856) (Jamaica; St. Domingo;—Mus. Brit.).
Macrosila brontes, Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 75 (1868) (= *collaris*).
Diludia brontes, Butler, *Trans. Zool. Soc. Lond.* ix. p. 612. n. 1 (1877) (Jamaica; Haiti); Kirby, *Cat. Lep. Het.* i. p. 681. n. 1 (1892) (Jamaica; Haiti; "N. America" *ex err.* !).
Diludia pamphilius, Butler, *l.c.* p. 613. n. 2 (1877) (= *brontes* (?); not *afflicta*).

Though Drury's figure of *brontes* is not very good, it cannot be referred to anything else but the present West Indian species. Some authors have had doubts on this point, chiefly on account of New York being given by Drury as the country from whence the insect came. If these authors had looked more carefully over Drury's work, as others have done, they would have noticed that the specimens in Dr. Fothergill's collection—from which collection Drury figured *brontes*—were in more than one instance erroneously labelled. On the same plate on which *brontes* is figured the North American *Pholus achemon* is also represented, and this species is said to be from Jamaica! Surely the localities of *brontes* and *achemon* were interchanged in Dr. Fothergill's collection.

♂ ♀. Antennae long, and in ♂ very thick in comparison with the size of the species. First segment of foretarsus much shorter than foretibia, without prolonged spines. *With* pulvillus.

♂. Tenth abdominal tergite very sharply pointed, hooked, compressed, barely dilated laterally before hook, but somewhat ventrally; sternite truncate, lateral margins curved upwards at end, with the upper angles sharp, the sternite appearing sinuate in an anal view. Clasper long and rather narrow, dorso-apical margin strongly bent inward; harpe triangular, pointed, ventral margin convex and then concave, upper margin feebly rounded (Pl. XXXVII. f. 16), denticulation minute. Penis-sheath with an apical tooth, which is different in the two subspecies (Pl. XXIX. f. 31. 32).

♀. Postvaginal plate strongly chitinised, triangularly dilated mesially, apical edge inerassate; antevaginal plate very short, almost membranaceous, rugate or folded, mesially sinuate, forming a very low transverse ridge.

Larva with oblique side-bands, very similar to that of *P. sexta jamaicensis*, spiracles, however, bright orange.

Hab. Jamaica; Porto Rico; Haiti; Cuba; Bahamas; South Florida.

Two subspecies:

a. P. brontes cubensis.

Sphinx brontes, Lucas, in Sagra, *Hist. Cuba* vii. p. 297 (1856) (Cuba) ; Herr.-Sch., *Corresp. Bl.* p. 149 (1863) (Cuba) ; id., *l.c.* p. 59 (1865) (syn. partim ; Cuba) ; Grote, *Proc. Ent. Soc. Phil.* v. p. 39 (1865) ; Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico) ; Möschl., *Abh. Senk. Nat. Ges.* xvi. p. 110. n. 107 (1891) (Porto Rico ; *syn. excl.*).
Sphinx cubensis Grote, *l.c.* v. p. 69. t. 1. f. 5 (♂) (1865) (Cuba).
Diludia brontes, id., *l.c.* p. 188 (1865) (Cuba) : id., *l.c.* vi. p. 329 (1867) ; Gundl., *Contr. Ent. Cubana* p. 214 (1881) (Cuba ; Porto Rico).
Diludia cubensis, Grote, *l.c.* p. 188 (1865) (=*brontes*) ; Kirby, *l.c.* n. 2 (1892) (Cuba).

♂ ♀. Black lines of upperside of forewing more prominent than in the following subspecies, third discal line better marked, the wing appearing more variegated. Tooth of penis-sheath (Pl. XXIX. f. 32), more pointed, slenderer, than in the following form.

Hab. Cuba ; Haiti ; Porto Rico ; South Florida.

In the Tring Museum 3 ♂♂, 3 ♀♀ from : Cuba ; Haiti ; Nassau, Bahamas (Sir G. Carter).

In coll. W. Schaus from Miami, Florida.

b. P. brontes brontes.

Sphinx brontes Drury, *l.c.* ; Goeze, *Ent. Beytr.* iii. 2. p. 219. n. 52 (1780).
Sphinx pamphilius Stoll, *l.c.*
**Macrosila collaris* Walker, *l.c.* (partim) ; Edwards, *Ent. Amer.* iii. p. 223 (1888).
Dolba pamphilus (!), Walker, *l.c.* p. 230 n. 2 (1856) (" not seen ").
Diludia collaris, Grote & Rob., *l.c.* v. p. 164. n. 86 (1865) ; Boisd., *l.c.* p. 110. n. 50 (1875).
Sphinx pamphilus (!), Boisduval, *l.c.* p. 115. n. 57 (1875) (" not seen ").
Diludia pamphilius, Kirby, *l.c.* n. 3 (1892) (" Surinam " *err. loc.*).

♂ ♀. The postdiscal interspace and a streak before SM^2 on the upperside of the forewing are buff or pinkish buff in the ♂ ; in ♀ the mesothoracic tegula, the subbasal and distal areas of the forewing, above, and a marginal patch near anal angle of hindwing are whiter than in *cubensis*.

Hab. Jamaica.

In the Tring Museum 10 ♂♂, 8 ♀♀ from Jamaica.

Stoll's figure of *pamphilius* refers doubtless to this form, which is often as strongly buffish in colour as the figure.

59. **Protoparce sesquiplex** (Pl. X. f. 4, ♂).

**Sphinx sesquiplex* Boisduval, *Cons. Lép. Guatemala* p. 73 (1870) (Felder's fig.) ; Feld., *Reise Novara* t. 78. f. 5 (1874) (Mexico ;—Mus. Tring) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 118. n. 61 (1875) (Mexico ; Guatemala).
Sphinx strix id., *Cons. Lép. Guat.* p. 73 (1870) (*nom. maxime supervac.*) ; id., *Spec. Gén. Lép. Hét.* i. p. 118 (1875).
Diludia sesquiplex, Butler, *Trans. Zool. Soc. Lond.* ix. p. 614. n. 8 (1877) (Guatemala) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 22. n. 1 (1883) (" not seen ") ; id., *l.c. Suppl.* p. 317 (1896) (partim ; Guatemala).
Phlegethontius sesquiplex, Kirby, *Cat. Lep. Het.* i. p. 688. n. 19 (1892) (Mexico ; Guatemala).

♂. Ground colour of body and wings whitish smoky grey. Antenna thick and long. Second and third segments of palpus together not much shorter than the first. Pulvillus vestigial. Tenth abdominal tergite (Pl. XXVII. f. 27) long, slender, pointed, gradually and slightly curved ; sternite more than twice as long as broad (Pl. XXVII. f. 28), truncate, mesially sinuate, subcarinate on the ventral surface, slightly curved upwards. Clasper gradually narrowed to apex ; dorso-apical margin

bent inwards ; harpe broad (Pl. XXXVI. f. 12), without ventral process, the distal margin bent basad, forming a rather sharp angle with the horizontal dorsal margin. Penis-sheath with a heavy, nearly apical, tooth (Pl. XXIX. f. 29) ; the edge of the sheath opposite the tooth bent inward and armed with another shorter, suberect tooth.

♀. Unknown.

Larva and chrysalis unknown.

Hab. Central America ; Mexico ; Guatemala.

In the Tring Museum 1 ♂ (*type*) ex coll. Felder, from Mexico.

60. **Protoparce muscosa** sp. nov. (Pl. XI. f. 1, ♀).

Diludia sesquiplex, Druce (*non* Boisduval, 1870), *Biol. Centr. Amer., Lep. Het. Suppl.* p. 317 (1896) (partim ; Matagalpa, Nicaragua).

♂♀. Generally confounded in collections with *sesquiplex*. Differs as follows : ground colour of body and wings much darker, being almost olive, forewing much less elongate, pale bands of hindwing less prominent.

♂. Tenth abdominal tergite (Pl. XXVII. f. 29) shorter and broader ; sternite also much shorter, not raised mesially on the ventral surface (Pl. XXVII. f. 30) ; harpe (Pl. XXXII. f. 13) similar to that of *sesquiplex*, but the distal margin less slanting, and the upper angle produced dorsad into a heavy tooth. Penis-sheath (Pl. XXIX. f. 30) with a longer tooth, which points distad.

♀. Eighth abdominal sternite strongly chitinised, raised into a heavy transverse tubercle just behind the mouth of the vagina ; antevaginal plate weak, wrinkled (in a dry state), margin almost straight.

Larva and chrysalis unknown.

Hab. Mexico ; Nicaragua ; Costa Rica.

In the Tring Museum 6 ♂♂, 5 ♀♀ from : Cenemarara, Mexico, vi. 1900 (*type* ♀) ; Huatuxco, Mexico ; 1 ♀ without locality (ex coll. Felder) ; Costa Rica (C. Underwood).

61. **Protoparce corallina.**

**Diludia corallina* Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 22. n. 2. t. 2. f. 3 (1883) (Mexico ; Guatemala ;—Mus. Brit.) ; Kirby, *Cat. Lep. Het.* i. p. 682. n. 8 (1892) (Mexico ; Guatemala).

♂♀. Claw segment *without* pulvillus. Thorax less robust than in *lichenea*, especially in ♂. Wings rather more elongate than in that species, but nearly exactly the same in pattern. Sexual organs of both sexes different from those of the following species. End of tarsus see Pl. LXIV. f. 13.

♂. Tenth tergite slenderer than in *lichenea* ; the sternite (Pl. XXVII. f. 25. 26) obviously longer, straighter, narrower, truncate, being very feebly sinuate. Harpe smaller, ventrally angled (Pl. XXXVI. f. 14). Tooth of penis sheath somewhat longer, basally thinner, and pointing a little more distad.

♀. Vaginal plate rounded apically (Pl. XX. f. 7), transversely convex before end ; vaginal cavity bordered in front by a transverse, curved, mesially sinuate ridge, a rather deep impression before the cavity is surrounded by an angulated ridge, the proximal horizontal part of which projects as a kind of lip ; the form of the groove is not quite constant, it being in the type longer than in the specimen from which the figure is taken.

Larva and chrysalis not known.

Hab. Central America: Mexico; Guatemala; Honduras.

In the Tring Museum 1 ♂, 2 ♀♀ from: Cuernavaca, Mexico; Rosery Mines, Hondnras, 3000—4000 ft.

Single specimens in several other collections.

62. Protoparce lichenea.

Sphinx lichenea Burmeister, *Sphing. Bras.* p. 67. n. 3 (1856) (N. Friburgo); Ménétr., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 89. n. 1471 (1857) (Brazil); Boisd., *Spec. Gén. Lép. Hét.* i. p. 111. n. 52 (1875) (Brazil); Burm., *Descr. Rép. Argent.* v. p. 318 (1878); id., *l.c. Atlas* p. 57 (1879) (Salta; Tucuman; descr. of *l.* & *i.*).

Sphinx pamphilius, Burmeister (*non* Stoll, 1780), *Sphing. Bras.* p. 67. n. 4 (1856) (N. Friburgo); id., *Descr. Rép. Arg.* v. p. 318 (1878).

**Macrosila lichenea* Walker, *List. Lep. Ins. B. M.* viii. p. 204. n. 9 (1856) (Rio de Janeiro;—Mus. Brit.).

**Diludia rufescens* Butler, *Proc. Zool. Soc. Lond.* p. 12. n. 26 (1875) (Rio de Janeiro;—Mus. Brit.); id., *Illustr. Typ. Specim. Lep. Het. B. M.* i. p. 2 t. 15. f. 6 (1877); id., *Trans. Zool. Soc. Lond.* ix. p. 614. n. 8 (1877); Kirby, *Cat. Lep. Het.* i. p. 681. n. 6 (1892); Rothsch., Nov. Zool. i. p. 541 (1894) (Aroa).

Diludia lichenea, Butler, *l.c.* p. 614. n. 9 (1877) (Brazil); Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 23. n. 3 (1883) (Cordova, Mexico); id., *l.c. Suppl.* p. 317 (1896) (Orizaba; Jalapa; Chiriqui); Kirby, *l.c.* n. 7 (1892) (Brazil); Rothsch., *l.c.* (1894) (Aroa).

Protoparce lichenea, Burmeister, *l.c. Atlas* p. 30. t. xi. f. 4 (*l.*) (1879).

Protoparce pamphilus (!), id., *l.c. Atlas* p. 30 (1879).

Diludia brontes, Rothschild, *l.c.* (Aroa).

Diludia corallina, id., *l.c.* (Aroa).

(?) *Diludia florestan*, Bönninghausen (*non* Stoll, 1782), *Iris* xii. p. 112. n. 8 (1899) (Rio de Jan.; partim).

♂ ♀. This species does not differ in structure from *P. florestan*. The forewing is more variegated than in *florestan*, the transverse lines, as a rule, being much more prominent, and hence appearing to be more numerous; the black discal streaks R^3—M^2 are short, often absent. The species varies individually to a considerable extent. *With* pulvillus. The differences between the two insects—if a series is compared—do not seem to us to be reliable. We should not be surprised if *florestan* and *lichenea* were proved to be one variable species. End of tarsus see Pl. LXIV. f. 11. 12.

Larva green, not yellowish, with small yellowish granules, which are sparse on the first three segments; side-bands narrow, pink, united above by a thin mesial line, each band rather deeper red behind (acc. to Burmeister, correct?).

Hab. Southern Brazil, North-West Argentina, northward to Mexico.

In the Tring Museum 10 ♂♂, 8 ♀♀ from: Mexico; Costa Rica; Chiriqui; Aroa, Venezuela; Petropolis.

In the Museum at Buenos Ayres from N.W. Argentina.

63. Protoparce florestan.

Sphinx florestan Stoll, in Cram., *Pap. Ex.* iv. p. 216. t. 394. f. B (1782) (Surinam); Burm., *Sphing. Bras.* p. 66. n. 2 (1856) (descr. of larva & pupa; N. Friburgo); Boisd., *Spec. Gén. Lép. Hét.* i. p. 112. sub n. 53 (1875); Burm., *Descr. Rép. Argent.* v. p. 318. n. 2 (1878) (N. Friburgo).

Cocytius florestan (!), Hübner, *Verz. bek. Schm.* p. 140. n. 1499 (1822).

Macrosila florestan (!), Walker, *List Lep. Ins. B. M.* viii. p. 203. n. 8 (1856) (Rio de Janeiro); Clem., *Journ. Ac. Nat. Sci. Philad.* iv. p. 167. n. 62 (1859) (S. Amer.; Honduras).

Sphinx floristan (!), Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 89. n. 1472 (1857) (Brazil).

Diludia florestan, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 164. n. 85 (1865); Butl., *Trans. Zool. Soc. Lond.* ix. p. 613. n. 3 (1877) (Rio de Janeiro); Kirby, *Cat. Lep. Het.* i. p. 681. n. 4 (1892);

Rothsch., Nov. Zool. i. p 541 (1894) (Aroa); Peters, *Illustr. Zeitschr. Ent.* iii. Heft. 22. t. 1. f. 4. (*l.*) (1898); Bönningh., *Iris* xii. p. 112. n. 8 (1898) (Rio de Jan.; partim).

Protoparce florestan, Burmeister. *l.c. Atlas* p. 30. t. xi. f. 2 (*l.*) (1879) (N. Friburgo); Kaye, *Trans. Ent. Soc. Lond.* p. 139 (1901) (Trinidad).

**Diludia brevimargo* Butler, *Proc. Zool. Soc. Lond.* p. 12. n. 25 (1875) (Brazil;—Mus. Brit.); id., *Illustr. Typ. Specim. Lep. Het. B. M.* i. p. 2. t. 15. f. 5 (1877); Kirby, *l.c.* n. 5 (1892); Rothsch., Nov. Zool. i. p. 541 (1894) (Aroa); Druce, *Biol. Centr. Amer., Lep. Het. Suppl.* p. 317. n. 4. t. 68. f. 1 (♂) (1896) (Mazatlan; Paso de S. Juan; Vera Cruz; Jalapa).

♂♀. Not at all constant, either in size or in markings, often barely distinguishable from *lichenea*. Fresh specimens have a greenish tint on the forewing, which often fades to a clayish yellow. The black discal streaks R^3—M^2 of the forewing are always very prominent on the pale ground. The specimens from Mexico do not differ, to our knowledge, from the Brazilian individuals. The single Trinidad ♂ in the Tring Museum has the forewing rather more elongate, bearing a remarkable resemblance to *Pseudosphinx tetrio*. Another ♂, from Cordova, Mexico, nearly agrees with it in the shape of the forewing. *With* pulvillus.

Larva with broad white side-bands, which become narrow dorsally, and include the stigmata; first band abbreviated ventrally.

Hab. Southern Brazil to Mexico.

In the Tring Museum 28 ♂♂, 16 ♀♀ from: Mexico (various places); Honduras; Paramba, Ecuador; Aroa, Venezuela; Port of Spain, Trinidad (Dr. P. Rendall); Rio de Janeiro; Bahuru, Sao Paulo (Dr. Hempel).

64. Protoparce lanuginosa.

Diludia collaris, Edwards (*non* Walker, 1856), *Papilio* iv. p. 13 (1884) (Vera Cruz).

Diludia lanuginosa id., *Ent. Amer.* iii. p. 89 (1887) (Vera Cruz); Beutenm., *Bull. Amer. Mus. N.H.* p. 170 (1892) (Jalapa, typ. spec. ex coll. Hy. Edwards); Kirby, *Cat. Lep. Het.* i. p. 682. n. 10 (1892) (Vera Cruz).

Diludia corallina, Druce, (*non* id., 1883), *Biol. Centr. Amer., Lep. Het. Suppl.* p. 317 (1896) (*corallina* = *lanuginosa* ex err.; Jalapa, Vera Cruz; Costa Rica).

♂♀. A duller, more uniformly coloured species than *florestan*. The forewing, above, is less whitish grey, the two discal streaks R^3—M^2 are less distinct, sometimes absent; the brown bands on the underside of the hindwing are more feebly marked, and the side-spots of the abdomen are less black. Structurally not different from *florestan* except in the head being proportionally smaller. The discal lines of the forewing are more strongly marked in the Honduras specimens than in the Mexican ones. *With* pulvillus.

Early stages not known.

Hab. Mexico to (Spanish) Honduras, probably extending farther south.

In the Tring Museum 3 ♂♂, 5 ♀♀ from: Cordoba, Mexico; Brit. Honduras; San Pedro Sula, Honduras.

65. Protoparce crocala.

**Pseudosphinx crocala* Druce, *Ann. Mag. N. H.* (6). xiii. p. 169 (1894) (Honduras;— coll. Staudinger); id., *Biol. Centr. Amer., Lep. Het. Suppl.* p. 316. n. 2. t. 67. f. 5 (♀) (1896).

♀. Pulvillus present. First protarsal segment without prolonged spines. Easily recognised by the grey basal third of the hindwing contrasting sharply with the brown outer two-thirds.—The eyes are too prominent in Druce's figure.

Hab. Honduras (Wittkugel).

A ♀ in coll. Staudinger, *type*. Two ♀♀ in coll. Charles Oberthür.

Not seen in other collections.

66. **Protoparce bergi** spec. nov. (Pl. V. f. 8, ♂).

♂ ♀. Body and wings greyish creamy buff, dusted with brown and ochreous scales. Palpus black at eye : head and thorax without markings ; abdomen with small black lateral patches on segments 2 to 4 ; tibiae darker than sterna, tarsal segments tipped with buff ; first protarsal segment with prolonged spines, externo-apical spines of following segments also long, but not stout. With pulvillus.

Wings, *upperside*.——Forewing with black dentate lines, four between base and apex of cell, the first and second incomplete, interrupted, indicated by spots, of which the costal ones are the most conspicuous, the third and fourth line geminate, curving costad in front ; three equidistant lines on disc, the proximal one generally more strongly pronounced ; a postdiscal line of lunules, sometimes vestigial, and a series of more or less vestigial, submarginal, reversed lunules, the oblique apical line vestigial or absent ; *no* stigma ; fringe buff, with small brown dots.——Hindwing: blackish brown, a costal space (covered by the forewing), an ill-defined anal area, extended along abdominal margin to base and also along distal margin, creamy buff, two black discal lines, curved before anal angle, more or less indistinct ; fringe as on forewing, dots indistinct or ill-defined.

Underside slightly pinkish.——Forewing : much more shaded with brown than upperside, traces of three discal bands.——Hindwing paler than forewing, a blackish band just beyond end of cell followed by two other bands, the middle one often absent ; a brown, ill-defined, broad submarginal band.

♂. Sexual armature very similar to that of *P. florestan*, the tenth sternite more deeply sinuate, the harpe less rounded, being longer basi-distally, teeth of upper margin rather heavy, the stronger ones bearing mostly one or two small ones.

Length of forewing : 45—47 mm.

Early stages not known.

Hab. Tucuman, Argentina.

We name the species in memory of the late Professor Carlos Berg.

In the Tring Museum 4 ♂♂, 1 ♀ from Tucuman ; and 2 ♂♂ from "Argentina."

XX. CHLAENOGRAMMA.—Typus : *jasminearum*.

Sphinx, Guérin (*non* Linné, 1758), *Icon. Règne Anim., Ins.* p. 494 (1829-44).
Diludia, Grote (*non* id., 1865), *List Lep. N. Am.* p. 5 (1868).
Chlaenogramma Smith, *Ent. Amer.* iii. p. 154 (1887) ; id., *Trans. Amer. Ent. Soc.* xv. p. 197 (1888) (type : *jasminearum*).

♂ ♀. Differs from *Protoparce* in the comb of long bristles of the midtarsus being absent or consisting of one or two reduced bristles, and in the smaller eyes. Head smaller in ♀ than in ♂ , as is the case in many *Protoparce*.

Pulvillus and paronychium present, this with one lobe on each side.

The type-species agrees almost in every detail with *Protoparce florestan*, of which it is a northern development. Apart from the absence of the mesotarsal comb there is indeed very little by which to distinguish *jasminearum* from *florestan*. The gap between *Chl. undata* and *jasminearum* is by far larger than the gap between *jasminearum* and *Protoparce florestan*. Nevertheless, *Chlaenogramma* is a step forward on the path of the reduction of organs. It is in our opinion a valid

genus,—though the characters in which it is said by its original definer to differ from *Protoparce* are not valid.

We emphasise that the genital armature of *Chl. jasminearum* is identical with that of *Protoparce florestan*. The opinion that specifically distinct insects are always different in the sexual armature is erroneous; insects identical in those organs may be different not only *specifically* but also *generically*.

Hab. America, from Canada to Argentina.

Key to the species:

Foretarsus without obviously prolonged spines . . . . . 67. *Chl. jasminearum*.
Foretarsus with obviously prolonged spines 68. *Chl. undata*.

67. Chlaenogramma jasminearum.

Sphinx jasminearum Guérin, *l.c.* p. 494. t. 84. f. 1 (*i.*). 1*a* (*l.*) (1829-44) (Am. bor.); Gray, in Griff., *An. Kingd.* xv. t. 83. f. 1. 1*a* (1832) (copy of Guér.'s plate); Wils., *Encycl. Brit.* ed. viii. t. 236. f. 5. 6 (1855); Clem., *Journ. Ac. Nat. Sci. Philad.* iv. p. 173. n. 71 (1859) (Long I.; N. York; Penn.); Morris, *Cat. Lep. N. Am.* p. 19 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 198. n. 9 (1862); Walk., *List Lep. Ins. B. M.* xxxi. p. 36 (1864); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 165. n. 91 (1865) (N. York; Penn.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 114. n. 56 (1875) (Am. sept.; on Fraxinus); Streck., *Lep. Rhop. Het.* p. 115. t. 13. f. 14 (1876) (larva descr.; N. York; N. Jersey; Penn.; etc.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 618. n. 4 (1877); Mart., *Trans. Dept. Agr. Illin.* xviii. *App.* p. 103 (1880); Pil., *Pap.* ii. p. 66 (1882) (Dayton, O., 1 ♂).

Dilucida jasminearum, Grote, *List Lep. N. Am.* p. 4 (1868); id., *Bull. Buffalo Soc. N. Sci.* i. p. 25 (1874); id., *l.c.* ii. p. 227. n. 49 (1875); Butl., *l.c.* p. 640 (1877); Grote, *l.c.* iii. p. 224. n. 50 (1877) (N. York; Penn.); id. *Canad. Ent.* xviii. p. 134. n. 59 (1886) (Georgia, northward); id., *Hawk-Moths N. Am.* p. 39 (1886) (Long I., rare in Middle States, not comm. in South); Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 45 (1889) (lit. rel. to transf.).

Sphinx jasminearum (!), Boisduval, *l.c.* t. 1. f. 4 (*l.*) (1875).

Chlaenogramma jasminearum, Smith, *Ent. Amer.* iii. p. 154 (1887); id., *Trans. Am. Ent. Soc. Lond.* xv. p. 199. t. 10. f. 2 (genit.) (1888) (N. York; N. Jersey; Penn.; Maine (?); Canada (?); Maryld.; Georgia); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N. York, electr. light); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 306. t. 6. f. 3 (*i.*) (1895) (short descr. of *i.*, *p.*, *l.*).

**Macrosila rotundata* Rothschild, Nov. Zool. i. p. 90. t. 7. f. 17 (1894) (hab.?—Mus. Tring).

♂ ♀. Anal angle of forewing rather less prominent than in *Protoparce florestan*, black longitudinal streak R^3—M^1 generally prolonged to postdiscal line or even to margin, which is very rarely the case in *P. florestan*, second streak, M^1—M^2, inconspicuous.

♂. Tenth abdominal tergite (Pl. XXVII. f. 31) prismatically compressed, highest before end, curved ventrad, pointed; sternite gently curved in side-view (Pl. XXVII. f. 32), almost flat, the edges slightly turned upwards, underside feebly convex, the lobe somewhat narrowed towards end, mesially incised, the two halves rounded. Clasper (Pl. XXXVI. f. 9) almost straight dorsally from base to apical fourth, then slanting, the dorso-apical margin bent inward; harpe rounded, concave, the distal edges turned up, densely denticulate. Apical tooth of penis-sheath horizontal, conical, pointing dextro-laterad, nearly as in *Protoparce petuniae* (Pl. XXIX. f. 25).

♀. Vaginal plate rounded distally, smooth, not scaled; proximal edge protruding above the membrane connecting the plate with the seventh sternite; vaginal orifice median, covered by a transverse projecting fold which is shallowly

sinuate mesially (Pl. XX. f. 8); the plate is mesially raised behind the vaginal orifice to a smooth, flat tubercle.

Larva pale yellowish green, with seven narrow side-bands, the first six white, the last white with a green and red anterior border.—Food: *Fraxinus*.

Pupa with very short tongue-case, bulbous at end, applied to the breast.

Hab. Eastern United States, from Georgia to N. England, westward to Pennsylvania and Canada.

In the Tring Museum 5 ♂♂, 1 ♀ from: Canada; Virginia; Pennsylvania.

68. **Chlaenogramma undata** spec. nov. (Pl. XI. f. 6. 7).

♂♀. First segment of foretarsus more than twice the length of segment 2, with four or five long exterior spines, segments 2 to 4 with a long externo-apical spine. Head and thorax pale olive, pro- and mesonotum with a black side-stripe, metanotum with a black and white lateral tuft. Abdomen marked with black transverse side-bands which separate the whitish grey side-patches.

Wings, *above*, greyish creamy buff or grey, shaded with brown, crossed by black lines and bands.——Forewing: traces of a basal and a subbasal line at costal margin; three antemedian lines, the proximal one feebly marked, all curving costad in front; a small whitish stigma with a thin brown border; three parallel lines on disc, almost regularly crenate, interspace between the first and second more or less blackish; an interrupted postdiscal line almost evenly curved from costa to M^2; submarginal line indicated by black halfmoons upon R^3 and M^1, interspace between first halfmoon and postdiscal line blackish (as in *jasminearum*, *P. florestan*, etc.); an oblique apical line joining the postdiscal line between SC^5 and R^1; two black discal streaks R^3—M^2 penetrating basad into the broad pale discal interspace; fringe with creamy white spots.——Hindwing: a large but ill-defined black basal patch; two parallel discal bands, the first the broader, of even width, situate just outside the cell, the second crenate, consisting of contiguous halfmoons; a broad marginal band, distally shaded over with grey scaling, a black dash running through the grey marginal scaling at the apex of the wing.

Underside: ground-colour as above.——Forewing: much more shaded with brown than above; of the discal lines the inner one indistinct, the others crenate, if more distinct.——Hindwing: a discal band just outside the cell, curving basad at abdominal margin, divided into two bands in anterior half; parallel with this is a third band, more or less strongly crenate, followed by a paler brown, ill-defined, submarginal band.

♂. Tenth abdominal tergite subprismatically compressed, convex beneath, curved downwards at end, apex rather suddenly narrowed into a long point; sternite not essentially different from that of *jasminearum*, more convex on upperside. Clasper and harpe as in the preceding, but the harpe much smaller. Penis-sheath also not differing from that of *jasminearum*.

♀. Vaginal plate of *undata cinerea* (Pl. XX. f. 9) similar to that of *jasminearum*, but the proximal part *much* shorter, the proximal edge of this ante-vaginal plate recurved in middle, the upper (or hinder) edge triangularly sinuate, with a (sensory) hair.

Larva and chrysalis not known.

Hab. Argentina, and (?) Costa Rica.

Two subspecies, which may turn out to be specifically distinct:

a. Chl. undata undata (Pl. XI. f. 6, ♂).

♂. Body and wings with an obvious clayish tint ; black side-line of thorax distinct on pronotum, a black transverse line at the base of pronotum connecting the longitudinal lines ; abdomen beneath with large brown patches, edges of segments pale creamy buff. Wings *above :* lines of forewing very sharply defined, interspace between the second and third discal line grey, border to hindwing 5½ mm. broad at apex, second discal line strongly carinate. *Below :* fore- and hindwing with two strongly crenate lines.

Hab. Costa Rica, 1 ♂ ; the locality seems to us to be doubtful.

b. Chl. undata cinerea subsp. nov. (Pl. XI. f. 7, ♀).

♂♀. Wings and body much more whitish grey than in the preceding subspecies ; the black markings of the pronotum less distinct, the white tufts of the metanotum conspicuous, the black spots of the abdominal sternites much smaller, the lines of the wings less sharply marked, less crenate, middle discal line of forewing below not crenate, marginal border of hindwing above broader.

♂. Tenth tergite shorter and higher than in the previous form, sternite broader before end. Harpe a little larger. Tooth of penis-sheath a trifle shorter. These differences may be individual.

♀. See above.

Hab. Cordoba, Argentina.

In the Tring Museum 1 ♀ (*type*) received from Prof. Carlos Berg. One ♂ in the British Museum, also from Prof. Berg ; other specimens in the Museum at Buenos Ayres.

The midtarsal comb is indicated by one prolonged bristle in the ♂ in the British Museum.

XXI. EURYGLOTTIS.—Typus : *aper*.

Macrosila Walker, *List Lep. Ins. B. M.* viii. p 204 (1856) (partim).
Euryglottis Boisduval, *Spec. Gén. Lép. Hét.* i. p. 68 (1875) (type : *aper*) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 612 (1877).

♂♀. Similar to *Protoparce*. Thorax and legs very rough with long erect hair-scales ; eye lashed. First segment of foretarsus without prolonged spines ; *no* pulvillus ; paronychium with one long lobe at each side ; long apical spur of hindtibia about half the length of the first tarsal segment.

♂. Tenth tergite elongate, rather gradually narrowed, obtuse, curved downward, prismatically compressed, almost flat above and carinate below, with rather numerous hairs ; sternite somewhat longer than tergite, concave above, convex below, somewhat rounded-dilated at the sides, apex rounded, apici-lateral margins turned inwards, fused with the upper surface, forming a kind of transverse carina which is interrupted mesially. Clasper weak, dorsal margin concave, ventro-apical margin oblique ; harpe short, almost concealed under a dense covering of short half-erect scaling, produced distally into a slender, flat, more or less curved or

twisted, obtuse process (Pl. XXXVII. f. 1—4). Penis-sheath armed with a strong, acuminate, apical tooth, which points more or less distad (Pl. XXIX. f. 17. 18. 19).

♀. Vaginal plate (Pl. XXI. f. 18) strongly chitinised, narrower at end, truncate or sinuate, proximal part irregularly wrinkled, or carinate and rugate; vaginal cavity large, median, transverse, covered by a large, long, triangular lobe.

Larva and chrysalis not known.

Hab. Tropical South America.

Four species.

Key to the species:

a.	The second segment of palpus not pale at ventral edge; forewing above without pale angle-shaped markings in submarginal area	69. *E. albostigmata*
	Second segment of palpus pale at ventral edge; forewing above with pale angle-shaped markings, mostly forming a zigzag line . .	*b.*
b.	R^2 of hindwing from centre of cell . . .	71. *E. davidianus.*
	R^2 „ „ much nearer R^3 than R^1—PC^2	*c.*
c.	Abdomen with white spots only . . .	70. *E. dognini.*
	„ „ large yellow lateral patches .	72. *E. aper.*

69. Euryglottis albostigmata.

**Euryglottis albostigmata* Rothschild, *Iris* vii. p. 301. n. 14 (1894) (Cauca Valley;—coll. Staudinger).

♂ ♀. The species differs remarkably in colour from the other Euryglottis, reminding one strongly of *Pseudodolbina fo.*

♂. Process of harpe short, spatulate, slightly twisted near end, and curved upwards (Pl. XXXVII. f. 3). Tooth of penis-sheath (Pl. XXIX. f. 18) short, stout.

♀. Not dissected. Hindwing above much more extended white than in ♂.

Hab. South America; Colombia; Ecuador.

In the Tring Museum 8 ♂♂, 2 ♀♀ from: Rio Dagua, Colombia; and Paramba, Ecuador (Rosenberg); S. Domingo, S.E. Peru (Ockenden).

In coll. Oberthür 4 ♂♂, 1 ♀, collected by Mons. Marc de Mathan at: Honda, Colombia; Juntas, Cauca; Balsapamba, Prov. Bolivar.

70. Euryglottis dognini.

Euryglottis aper, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 57 (1875) (partim).
**Euryglottis dognini* Rothschild, Nov. Zool. iii. p. 325. n. 11 (1896) (Loja; Colombia;—Mus. Tring).

♂ ♀. Abdomen with three rows of white spots on each side, the middle row not yellow as in the two following species; beneath with a large white patch at the base, tips of coxae also white.

♂. Harpe shorter (Pl. XXXVII. f. 2) than in *aper*, the sexual armature otherwise almost identical with that of *aper*.

♀. Vaginal plate sinuate at end, antevaginal lobe rounded-pointed, carinate mesially.

Hab. South America: Ecuador; Colombia; Venezuela.

In the Tring Museum 6 ♂♂, 2 ♀♀ from: Loja, Ecuador, *type* ♂; Merida, Venezuela (Briceno); "Colombia."

71. Euryglottis davidianus.

**Euryglottis davidianus* Dognin, *Le Natural.* xiii. p. 159 (1891) (Loja ;—coll. Dognin) ; Kirby, *Cat. Lep. Het.* i. p. 685. n. 2 (1892) (Loja).

♂ ♀. Similar in appearance to *E. aper*. The paler head, smaller yellow abdominal spots, straighter subbasal and discal lines of forewing, and the differences in structure distinguish the species abundantly.

♂. Process of harpe (Pl. XXXVII. f. 4) twisted, curving ventrad. Tooth of penis-sheath (Pl. XXIX. f. 19) short, stout.

♀. Not dissected.

Hab. Loja, Ecuador.

In the Tring Museum 1 ♂ from Loja, 19. ix. '87, received from Mons. Paul Dognin, who has 2 ♂♂ and 2 ♀♀ from the same locality, one of them caught in April 1894.

72. Euryglottis aper.

**Macrosila aper* Walker, *l.c.* p. 204. n. 10 (1856) (Bogota ;—Mus. Brit.).
Sphinx apex (!), Schaufuss, *Nunq. Otios.* i. p. 15 (1870) (Venezuela).
Euryglottis aper, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 68 (1875) (Bogota ; partim).

♂. Process of harpe (Pl. XXXVII. f. 1) rather long. Tooth of penis-sheath (Pl. XXIX. f. 17) long, slender, pointing obliquely distad.

♀. Vaginal plate (Pl. XXI. f. 18) more or less rounded-truncate at end ; antevaginal lobe truncate sinuate.

Hab. South America ; Venezuela ; Colombia southward to Bolivia.

Two subspecies :

a. E. aper aper.

**Macrosila aper* Walker, *l.c.*
Euryglottis aper, Boisduval, *l.c.* ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 612 (1877) ; Dogn., *Le Natural.* xiii. p. 159 (1891).

♂ ♀. Abdominal sternites 3 to 5 with indistinct apical dots. Discal band of three lines of upperside of forewing well-marked.

Hab. Venezuela ; Colombia.

In the Tring Museum 30 ♂♂, 3 ♀♀ from : Venezuela ; Rio Dagua, Colombia (Rosenberg) ; near town of Bogota, March ; Popayan, Columbia (Lehmann).

b. E. aper guttiventris subsp. nov.

♂. Abdominal sternites 3 to 5 with distinct apical spots, basal patch of abdomen pale. Discal band of forewing and the vein-streaks less distinct than in *aper aper*.

♀. Unknown.

Hab. Bolivia.

In the Tring Museum 3 ♂♂ from : Rio Songo (*type*, Garlepp) ; Chulumani, 2000 m., Dec. 1900, wet season (Simons).

XXII. APOCALYPSIS.—Typus : *velox*.

Apocalypsis Butler, *Trans. Zool. Soc. Lond.* ix. p. 641 (1877) (type : *velox*).

♂ ♀. Thorax not rough-scaled as in *Euryglottis*. Eye not lashed. Legs longer than in *Euryglottis*, much more smoothly scaled ; spur of foretibia not

reaching end of tibia, long terminal spur of hindtibia more than two-thirds the length of the first tarsal segment, little shorter than the tibia; claw-segment as in *Euryglottis*. Antenna of ♀ similar to that of ♂, compressed, with long fasciculated ciliae.

♂. Tenth tergite long, narrow, pointed, curved downward, carinate beneath; sternite also elongate, slightly narrowed to the end, which is rounded. Clasper without patch of modified scales; harpe obtusely triangular, not prominent, densely covered with half-erect scales, which conceal the outline of the harpe. Penis-funnel ventrally ending in a short, rounded lobe; penis-sheath armed with a strong, conical, apical tooth, which points dextro-laterad and a little distad, and is shorter than the diameter of the penis-sheath.

♀. Vaginal plate (Pl. XXI. f. 17) much folded in front of the large vaginal cavity; the postvaginal part smooth, rather stronger chitinised than the proximal part.

Early stages not known.

Hab. North India.

One species.

73. Apocalypsis velox.

**Apocalypsis velox* Butler, *Trans. Zool. Soc. Lond.* ix. p. 641 (1877) (Darjiling;—coll. Staudinger); Moore, *Descr. Lep. Atkins.* p. 5 (1879); Kirby, *Cat. Lep. Het.* i. p. 686. n. 1 (1892) (Darjiling); Hamps., in Blanf., *Fauna Brit. India, Moths* i. p. 107. n. 171. f. 62 (♂) (1892) (Sikhim; Khasis); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 416. n. 171 (1898) ("not seen").

♂ ♀. The similarity between this Indian insect and the American *Euryglottis aper* is surprisingly close as regards the pattern of the forewing.

The distal margin of the forewing is slightly undulate in the ♀.

Hab. North India: Sikhim; Assam.

In the Tring Museum 6 ♂♂, 2 ♀♀ from: Khasia Hills, Assam.

XXIII. PSEUDODOLBINA.—Typus: *fo*.

Zonilia Walker, *List Lep. Ins. B. M.* viii. p. 195 (1856) (partim; type: *viridescens*).
Dolba, Butler (*non* Walker, 1856), *Trans. Zool. Soc. Lond.* ix. p. 612 (1877).
Pseudosphinx, id. (*non* Burmeister, 1856), *Illustr. Typ. Specim. Lep. Het. B.M.* v. p. 16 (1881); Hamps., in Blanf., *Fauna Brit. India, Moths* i. p. 104 (1892); id., *l.c.* iv. p. 453 (1896) (= *Pseudodolbina*).
Hyloicus, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 694 (1892).
Pseudodolbina Rothschild, Nov. Zool. i. p. 27 (1894) (type: *veloxina=fo*).

♂ ♀. Closely allied to *Apocalypsis*. Eye lashed. Antenna of ♀ almost cylindrical, with the basal rows of fasciculated ciliae vestigial. First segment of hindtarsus shorter than tibia, not longer than segments 2 to 5 together, twice as long as long terminal spur of hindtibia.

♂. Tenth tergite elongate, tapering to end, which is somewhat obtuse (Pl. XXVIII. f. 28); sternite much broader, triangular, the sides turned upwards, hence the under surface convex, apex more or less distinctly sinuate (Pl. XXVIII. f. 29). Clasper without patch of modified scales; inner surface covered distally with hair-scales which lean basad; harpe covered with suberect, short scales, except at end. Penis-sheath armed with a single, long, pointed tooth which is directed dextro-laterad, pointing somewhat proximad (Pl. XXVIII. f. 45. 46).

♀. Vaginal cavity large, mouth subcircular, in and before middle, the edge somewhat raised, without lobes; postvaginal part of plate chitinised in middle (Pl. XXI. f. 23).

Early stages not known.

Hab. North India.

Two species.

Zonilia and *Pseudosphinx* do not belong to this subfamily, nor even to the *Sphingidae asemanophorae*.

Terminal spurs of hindtibia equal in length	.	.	74. *P. aequalis.*
„ „ „ „ not equal in length		.	75. *P. fo.*

74. Pseudodolbina aequalis spec. nov.

♂. Ground colour of upperside of body and forewing of a peculiar greenish olive colour, with a distinct shade of yellow in fresh specimens. The interspace between the two lines proximal of stigma on forewing more or less filled up with blackish scaling, at least in front. The pale parts of the fringe of both wings greyish white with a shade of yellow. The terminal spurs of hindtibia of almost exactly the *same length*.

♂. Harpe sinuate at end, the two lobes nearly the same in length (Pl. XXXV. f. 23).

♀. Not seen.

Hab. Assam.

In the Tring Museum 5 ♂♂ from: Khasia Hills, May '94 (*type*); Cherrapunji.

75. Pseudodolbina fo.

**Zonilia fo* Walker, *List Lep. Ins. B.M.* viii. p. 195. n. 6 (1856) (N. India;—Mus. Brit.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 147. n. 15 (1875) (Ind. or.).

Dolba fo, Butler, *Trans. Zool. Soc. Lond.* ix. p. 612. n. 1 (1877) (N. India).

Pseudosphinx fo, id., *Illust. Typ. Specim. Lep. Het. B.M.* v. p. 16. t. 81. f. 9 (1881); Swinh., *Cat. Lep. Het. Ox.* i. p. 32. n. 128 (1892) (India); Hamps., in Blanf., *Fauna Brit. India, Moths* i. p. 104. n. 166 (1892) (Sikhim); id., *l.c.* iv. p. 453. n. 166 (1896) (=*veloxina*); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 416. n. 166 (1898) ("not seen").

Hyloicus fo, Kirby, *Cat. Lep. Het.* i. p. 694. n. 6 (1892) (N. India).

**Pseudodolbina veloxina* Rothschild, Nov. Zool. i. p. 27. t. 6. f. 18 (1894) (Khasia Hills;—Mus. Tring).

♂♀. Upperside of body and forewing deeper in colour in fresh specimens, being less yellow than in *aequalis*, much dusted with grey scales; mesothoracic tegula with a short black vitta; yellow spots of proximal segments of abdomen larger, the yellow colour of palpus sharper defined, foretarsus more extended yellow on the upperside, the stigma of the forewing larger, and the pale parts of the fringe of both wings more yellow than in *aequalis*. The interspace between the two lines of forewing proximal of stigma not filled up with black scaling. Spurs of hindtibia *unequal*, the long terminal one being about one-third *longer* than the other.

♂. Harpe (Pl. XXXV. f. 24) ending in a single, rather prominent, pointed process directed dorso-distad. Tooth of penis-sheath (Pl. XXVIII. f. 45. 46) a little longer than in the preceding species.

♀. Vaginal plate see above (Pl. XXI. f. 23).

Hab. North India: Khasia Hills, Assam; Sikhim.

In the Tring Museum 4 ♂♂, 1 ♀ from: Khasia Hills, April, 1894; Cherrapunji, June 1893.

XXIV. DOLBA.—Typus: *hylaeus*.

Sphinx, Drury (*non* Linné, 1758), *Illustr. Ex. Ins.* ii. Index (1773).
Hyloicus Hübner, *Verz. bek. Schm.* p. 139 (1822) (partim ; type : *pinastri*).
Lethia id., *l.c.* p. 140 (partim ; type : *ligustri*).
Dolba Walker, *List Lep. Ins. B. M.* viii. p. 229 (1856).

♂ ♀. Antenna thickest in basal half. First segment of tarsi shorter than tibiae. D^3 of hindwing as long as, or somewhat shorter than, D^1. Scaling of head long, hanging over the eyes as a kind of eye-lashes ; palpus also rough-scaled. Tibiae *not* spinose ; first segment of foretarsus externally with a number of spines at base besides the normal first row, all these spines of about the same length, none obviously longer and stouter ; midtarsus with comb ; *pulvillus and paronychium present*.

♂. Tenth tergite prismatically compressed, under surface reduced almost to a line, dilated ventrad before end, apex sharply hooked, the dilated part rough with wrinkles and granules ; sternite resembling that of *Protoparce sexta*, the side-margins parallel, turned upwards and inwards just before end. Clasper elongate sole-shaped ; harpe triangular, produced into an obtuse ventro-distal process, surface somewhat concave, with dispersed scales, edges not dentate. A short triangular obtuse penis-funnel beneath the penis-sheath ; the latter, as in *Protoparce rustica* and other species, with an apical, almost horizontal, tooth pointing dextro-laterad and somewhat distad. Scales at lateral edge of seventh tergite prolonged to distinct tufts, reminding one of *Macroglossum*.

♀. Vaginal plate proximally broadly rounded, produced in front of the median, transverse, vaginal cavity into a broad, irregularly notched ridge, which, in a ventral view, covers the cavity entirely ; postvaginal portion of plate more or less membranaceous, rounded, scaled (except in middle line).

Larva with six distinct white and red oblique lateral bands, the band on segment 5 not being well marked ; head granulose, rounded.—Food : *Prinos*, *Ilex*, *Comptonia*, *Asimina*.

Pupa with free tongue-sheath, which is closely applied to the breast.

Hab. North America.

The genus is closely related to *Protoparce*. It contains only one species, which resembles *Protoparce rustica* in the colour of the wings, and several other *Protoparce* in that of the body. It is more specialised than any species of *Protoparce* in possessing eye-lashes, while it agrees with the more generalised species of *Protoparce* in the possession of a pulvillus.

76. Dolba hylaeus.

Sphinx hylaeus Drury, *l.c.* ii. p. 45. t. 26. f. 3 and Index (1773) (N. York) ; Cram., *Pap. Ex.* ii. p. 16. t. 107. f. c (1777) (N. York) ; Goeze, *Ent. Beytr.* iii. 2. p. 217. n. 47 (1780) ; Fabr., *Spec. Ins.* ii. p. 149. n. 45 (1781) (Am. bor.) ; id., *Mant. Ins.* ii. p. 97. n. 49 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2383. n. 81 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 373. n. 53 (1793) ; Lep. & Serv., *Enc. Méth.* x. p. 465. t. 66. f. 7 (1825) ; Drury, ed. Westw., ii. p. 49. t. 26. f. 3 (1837) (*prini=hylaeus*) ; Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 296. n. 8 (1839) (=*prini* ; *l.* with 6 or 7 bands) ; Morris, *Cat. Lep. N. Am.* p. 18 (1860) (syn. partim) ; Harris, ed. Flint, *Ins. Inj. Veg.* p. 328 (1862) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 98. n. 36 (1875) (*l.*, *p.* ; N. Am.) : Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O.) ; Reed, *Rept. Ent. Soc. Ont.* xii. p. 70 (1882) (larva).
Sphinx prini Abbot & Smith, *Lep. Georgia* i. p. 69. t. 35 (1897).
Hyloicus hylaeus, Hübner, *Verz. bek. Schm.* p. 139. n. 1487 (1822).
Lethia prini, id., *l.c.* p. 141. n. 1509 (1822).

Dolba hylaeus, Walker, *l.c.* (1856) (partim ; "Mexico" alia spec.) : Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 178. n. 80 (1859) (syn. partim ; "Mexico" alia spec.) ; id., in Morris, *Synops. Lep. N. Am.* p. 204 (1862) ; Thaxt., *Canad. Ent.* i. p. 30 (1874) (Newton, Mass., vi.-vii.) ; Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 26 (1874) ; id., ii. p. 228 (1875) ; id., *l.c.* iii p. 225 (1877) (Mass. ; Missouri ; Ohio ; S. States) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 612. n. 2 (1877) (Philad. ; Mass.) ; Scudd., *Psyche* ii. p. 77 (1877) (larva, detail. descr. ; on *Comptonia asplenifolia*) ; Fern., *Canad. Ent.* xvi. p. 22 (1884) (Maine, rare) ; Harringt., ibid., xvi. p. 54 (1884) (larva ; Ottawa) ; Fern., *Sphing. N. Engl.* p. 48. n. 21 (1886) ; Grote, *Hawk Moths N. Am.* p. 39 (1886) ; Holl., *Canad. Ent.* xviii. p. 103 (1886) (S. Indiana, common ; on *Asimia triloba*) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 196 (1888) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 48 (1889) (lit. rel. to transf.) ; Kirby, *Cat. Lep. Het.* i. p. 684. n. 1 (1892) (N. Amer.) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 309. t. 6. f. 4 (1895) (N. York ; *l.* with 7 stripes, on *Ilex glabra*) ; Rowl., *Ent. News* ix. p. 191 (1898) (Missouri) ; id., ibid. x. p. 11 (1899) (Missouri, common, *l.* on Pawpaw).

Dolba hyleus (!), Cross, *Ent. News* vii. p. 297 (1896) (N. Hampshire).

♂ ♀. Cramer's figure was taken from a specimen in Lennep's collection ; there is an individual from this collection in the Tring Museum (ex coll. Felder) which may have served as original for Cramer's figure. The species varies a good deal individually.

Larva : head granulose, not rugate, with a pale blue side-stripe ; seven side bands, but only six distinct and bordered deeper red in front, pale rose-colour behind, these borders not extending on the next segment, except the last ; stigmata with the edges of the slit black.

Tongue-case of chrysalis free, closely applied to the breast, 4 mm. long.

Hab. Eastern regions of N. America : from Canada to Alabama and Florida, westward Missouri and Iowa.

In the Tring Museum several larvae, one pupa, and 19 ♂♂, 9 ♀♀ from various places.

XXV. DOLBOGENE gen. nov.—Typus : *hartwegi*.

Dolba Walker, *l.c.* (partim).

♂ ♀. Differs from *Dolba* in the short, long-spined, first protarsal segment, and short spurs ; from *Gargantua* in the presence of the pulvillus and non-spinose tibiae.

Larva and chrysalis not known.

Hab. Central America.

One species. A development of *Dolba*.

77. Dolbogene hartwegi.

Dolba hylaeus, Walker, *l.c.* (partim ; Mexico).

**Dolba hartwegi* Butler, *Proc. Zool. Soc. Lond.* p. 259. n. 55 (1875) (Oaxaca ;—Mus. Brit.) ; id., *Trans. Zool. Soc.* ix. p. 612. n. 3 (1877) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 22. n. 1 (1883) (Oaxaca) ; Kirby, *Cat. Lep. Het.* i. p. 685. n. 2 (1892) ; Druce, *l.c. Suppl.* p. 316 (1896) (Honduras).

♂. Tenth abdominal tergite slender, compressed, somewhat depressed at end, apex obtusely pointed ; sternite almost as narrow as the tergite, horizontal, the sides curved upwards, the under surface therefore convex, upper surface distally somewhat grooved in middle. Harpe (Pl. XXXV. f. 27) very short and small, without

patch of suberect scales. Penis-sheath with a very minute apical lobe indicating the tooth of the allied Sphingidae.

♀. Antenna almost cylindrical.

Hab. Mexico ; Honduras ; probably more widely distributed in Central America.

XXVI. ISOGRAMMA gen. nov.—Typus : *hageni*.

Ceratomia, Grote (*non* Harris, 1839), *Bull. Buff. Soc. Nat. Sci.* ii. p. 149 (1874).
Daremma, id. (*non* Walker, 1856), *l.c.* iii. p. 224 (1877).
Sphinx, Strecker (*non* Linné, 1758), *Lep. Rhop. Het.* p. 127 (1878).

♂ ♀. Antenna of ♀ with a row of prolonged ciliae. Foretibia *spinose* at end ; first segment of foretarsus little longer than second, with some long stout spines ; midtibia with a few *spines* at the very end, midtarsus *without* comb ; paronychium and pulvillus *present*. Tubercle of labrum with sharp edge.

♂. Tenth tergite prismatically compressed, sulcate above, except at convex apex, convex beneath, becoming carinate at end, apex curved downwards, pointed in side-view, obtuse in frontal view ; sternite mesially divided into two conical pointed processes (Pl. XXVIII. f. 4) which are curved upwards at end. Clasper broadly sole-shaped, widest before middle, apex broadly rounded, a short, high, subdorsal fold, ending where the clasper widens dorsad ; harpe (Pl. XL. f. 3) scaled on surface as in *Chlaenogramma*, a pointed, finger-like, ventro-distal process, and a broad, short, rounded upper lobe, dorsal edge of harpe irregularly dentate. Penis-sheath armed with an apical, conical, horizontal tooth which slants distad a very little.

♀. Vaginal plate nearly as in *Chlaenogramma*, but the ridge before the mouth of the vagina mesially deeper sinuate and somewhat impressed at the sinus (Pl. XX. f. 11).

Larva covered with dispersed, transversely seriated granules, side-bands bordered with red ; head granulose (sub-triangular ?).

Hab. Texas.

One species.

In the shortness of the foretibia and first segment of the foretarsus the only species of this genus agrees with the species of *Ceratomia*, and in the preservation of the pulvillus with *Chlaenogramma*, while it differs from both genera in the foretibia and the extreme apex of the midtibia being armed with spines. The spinosity of the tibia is an advanced character, not acquired by *Ceratomia*, while the pulvillus is an ancestral structure already lost in *Ceratomia*. Therefore the genus *Isogramma*, though closely related to *Ceratomia*, is in one respect more advanced than this, and in another it lags one step behind. This clearly shows that *Isogramma* and *Ceratomia* represent two divergent lines of development. With a little power of construction it is not difficult to conceive that one and the same link is missing both between *Ceratomia* and *Chlaenogramma*, and between this and *Isogramma*, this link being the common ancestor of *Isogramma* and *Ceratomia*, characterised by the possession of a pulvillus, not-spiny tibiae, and short and strongly armed first segment of anterior tarsus. From this ancestral form *hageni* branched off by acquiring spinose tibiae (and in ♀ andromorphic antennae), preserving the pulvillus, while *Ceratomia* became differentiated by losing the pulvillus, but keeping the unarmed tibiae. A further differentiation into three

species took place within *Ceratomia*, while *Isogramma* remained represented only by one species. Now, if there are other forms to be discovered which are further developments from *Ceratomia* and *Isogramma*, it is obvious, judging from the general tendency of evolution among the *Acherontiinae*, that the next step beyond *Isogramma* would be represented by an insect with spiny tibiae, but without pulvillus, and that the next step beyond *Ceratomia* would be a form without pulvillus as in *Ceratomia*, but with spiny tibiae; the two forms, therefore, thus resulting, although not of the same origin, would be identical in those characters. In such instances the classifier who endeavours to give a classification based upon blood-relationship has to be careful. There are many traps for the classifier who is merely guided by the presence or absence of a certain character. Similarity and blood-relationship are not identical conceptions. Spinosity of the legs and reduction in their length, reduction of paronychium, pulvillus, tongue, and palpus, appearance of fasciculated ciliae on the ♀-antennae recur in many instances among *Acherontiinae* and *Ambulicinae* in phylogenetically widely separated forms. Only by closely following the various lines of development is it possible to distinguish between what is similar and what is related.

78. Isogramma hageni.

Ceratomia hageni Grote, *l.c.* ii. p. 149 (1874) (Texas); id., *l.c.* ii. p. 227. n. 47 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 621. n. 2 (1877) (Texas); Maass., *Stett. Ent. Zeit.* p. 16 (1880) (not a *Cerat.*, but prob. a *Daremma*); Grote, *Papilio* ii. p. 176 (1882) ("Kansas" err. loc.); Smith, *Trans. Amer. Ent. Soc.* xv. p. 204 (1888) (Texas).

Daremma hageni Grote, *Bull. Buff. Soc. N. Sc.* iii. p. 224. n. 49 (1877) (Texas); id., *Papilio* iii. p. 65 (1883) (Texas, not Kansas); Kirby, *Cat. Lep. Het.* i. p. 684. n. 2 (1892) (Texas).

Sphinx hageni, Strecker, *Lep. Rhop. Het.* p. 127. t. 14. f. 6 (1878) (Texas; descr. of larva); Riley, *Rept. U. St. Dept. Agr.* p. 193. t. 12. f. 2 (*i.*, *l.*) (1882).

The forewing has a yellowish green tint, which is not present in *Ceratomia undulosa*, with which a casual observer might confound the present species.

Hab. Texas.

In the Tring Museum 1 ♂, 2 ♀♀.

XXVII. CERATOMIA.—Typus: *amyntor*.

Agrius Hübner (*non* id., 1822), *Samml. Ex. Schm.* (1824?) (*nom. indescr.*).
Ceratomia Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 293 (1839) (type: *amyntor*).
Macrosila Walker, *List Lep. Ins. B. M.* viii. p. 199 (1856) (partim).
Daremma id., *l.c.* p. 231 (1856).
Sphinx, Grote, *Proc. Ent. Soc. Philad.* v. p. 72 (1865).
Diludia id. (*non* id., 1865), *Bull. Buffalo Soc. N. Sci.* iii. p. 224 (1877).
Pseudosphinx, Butler (*non* Burmeister, 1856), *Trans. Zool. Soc. Lond.* ix. p. 629 (1877).

♂♀. Tongue, palpus and eye reduced; antenna of ♀ not andromorphic; tubercle of labrum with sharp edge. Tibiae *unarmed*; foretibia short, first segment of foretarsus not essentially different in length from second, armed with three or four long stout spines externally, externo-apical spines of segments 2 to 4 not obviously prolonged; midtarsus *without* comb; pulvillus *absent*; paronychium present with one lobe on each side.

Larvae very different in the three species. The larva of *C. undulosa* represents a more ancestral type than those of the two other species. The divergency in the

structure and colour of the larva does not speak against the insects being united under one generic term. The dissimilarity is not an expression of different origin of the forms, but of adaption of phylogenitically the same forms in different directions. As a matter of course, there is some justification in pleading that each of these species represents a genus of its own; but we reject such a procedure, as it would necessitate, if consequently carried out, the erection of a genus for practically every species, and would lead in the end to a mere shifting of terms, genus being substituted for species, and species for geographical race (subspecies).

Pupa: tongue-case not projecting, not reaching to end of wing-cases, except *amyntor*.

The sexual armature confirms the relationship of *Ceratomia* with *Isogramma* and *Chlaenogramma*.

Hab. Eastern parts of the Nearctic Region.

Three species.

Key to the species:

a. Postdiscal band of hindwing, below, sharply dentate	*b*.	
Postdiscal band of hindwing not dentate . .	81.	*C. catalpae*.
b. Pale fringe-spots of forewing very much smaller than the brown spaces between them . .	79.	*C. amyntor*.
Pale fringe-spots of forewing the same size about as the brown spaces between them . . .	80.	*C. undulosa*.

79. Ceratomia amyntor.

Agrius amyntor Hübner, *Samml. Ex. Schm.* iii. t. 39 (1824?).

Ceratomia quadricornis Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 293 (1839) (*l.* on *Ulmus americana*); id., *Ins. Inj. Veget.* p. 227 (1841) (*l., p.*); Walk., *List Lep. Ins. B.M.* viii. p. 258 (1856) (Mass.); Clem., *Journ. Ac. Nat. Sci. Philad.* iv. p. 179. n. 82 (1859) (Mass.; Penn.; Michig.; *l., p.*); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. N. Am. Lep.* p. 205 (1862); Pack., *Rept. N. Hist. & Geol. Maine* ii. p. 167 (1862); Lint., *Proc. Ent. Soc. Philad.* i. p. 286 (1863) (metam.; *Ulmus*); Jaeg., *Life N. Am. Ins.* p. 192 (1864); Lint., *Proc. Ent. Soc. Philad.* iii. p. 664 (1864) (pupa); Harris, *Ent. Corresp.* p. 282 (1869) (*l., p.*); Andr., *Canad. Ent.* viii. p. 40 (1876) (Brooklyn, brown *l.*); Bunk., *ibid.* viii. p. 120 (1876) (Rochester, N.Y., brown *l.*, Engl. Elms); French, *Trans. Dept. Agric. Illin.* xv. p. 167 (1877); Fletch., *Canad. Ent.* xii. p. 212 (1880) (Ottawa); Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 102 (1880) (larva); Hag., *Papilio* iii. p. 61 (1883) (*quadr.* to be retained); Harris, ed. Flint, *Ins. Inj. Veget.* p. 323. fig 148 (1883).

Ceratomia amyntor, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 164. 190 (1865); Beth., *Canad. Ent.* i. p. 71. n. 20 (1869) (Canada); Minot, *ibid.* ii. p. 28 (1870) (egg, *l.*); Bowl., *ibid.*, iii. p. 143 (1871) (Quebec, vi.); Lint., *Ent. Contr.* i. p. 192 (1872) (N. York, *l.*: vi. E. vii., viii.; *l.*: E. viii. ix.); Thaxt., *Psyche* i. p. 30 (1874) (Mass., E. vi.—E. vii.); Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 24 (1874); id., *l.c.* ii. p. 227. n. 46 (1875); Cauff., *Canad. Ent.* vii. p. 241. n. 11 (1875) (Montreal, common, vi.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 53. t. 1. f. 2 (*l.*) (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 621. n. 1 (1877) (Mass., Mexico!); Grote, *l.c.* iii. p. 224. n. 47 (1877) (Canada; Mass.; Penn.; Mich.); Pil., *Papilio* ii. p. 66 (1882) (Dayton, O., not rare); Good., *Psyche* iii. p. 368 (1882) (Mass.; *Ulmus*, *Betula*); Reed, *Rept. Ent. Soc. Ont.* xii. p. 64 (1882) (larva); Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 24 (1883) (N. Am.; "Mexico" teste Mus. Brit.); Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine, rare); id., *Sphing. N. Engl.* p. 24. n. 9 (1886) (metam.); Grote, *Hawk Moths N. Am.* p. 38 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 201. t. 10. f. 5. 6 (genit.) t. 11. f. 1. (leg) (1888) (Canada to Virginia, westw. to Missouri, Iowa); Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 44 (1889) (lit. rel. to metam.); Pack., *U. St. Dept. Agr., Rpt. Ent. Comm.* v. p. 242. n. 28. t. 11. f. 1 (*l.*) (1890) (metam.); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N. York, electr. light); Kirby, *Cat. Lep. Het.* i. p. 695. n. 1

(1892) (N. Am.); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 307. t. 6. f. 6 (1895) (N. York; vi. vii.; larva, pupa); Druce, *l.c. Suppl.* p. 319 (1896) (Orizaba, teste Boucard); Cross, *Ent. News* vii. p. 297 (1896) (N. Hampsh., common); Rowl., *ibid.* ix. p. 191 (1898) (Missouri); id., *l.c.* x. p. 12 (1899) (Missouri).

Sphinx ulmi Boisduval, *l.c.* sub syn. (1875) (nom. max. supervac.!).

Ceratomia ulmi, Edwards, *Ent. Amer.* iii. p. 223 (1888) (=*amyntor*).

♂♀. Distal margin of forewing more straight than in the other species, somewhat sinuate before hinder angle; the greater part of the wing sometimes with whitish flush, in which case also the underside is more grey than in ordinary individuals. First segment of foretarsus shorter in ♂ than in ♀; long terminal spur of hindtibia two-thirds the length of the first tarsal segment.

♂. Tenth abdominal tergite broad, prismatical, subcarinate beneath, slightly convex above, curved, a little dilated ventrad before apex, ending in a short hook; sternite narrow, mesial lobe divided by a narrow slit into two slender, elongate triangular, pointed lobes, which are somewhat curved dorsad (Pl. XXVIII. f. 1). Clasper roundedly oblique ventrally, almost straight dorsally, somewhat dilated dorso-apically; harpe (Pl. XXXVIII. f. 17) short, nearly oblong, truncate distally, with the angles rounded, concave proximally, the apical surface and edge rough with sharp tubercles and teeth. Penis-sheath with a rather short, conical, apical, horizontal tooth which points slightly distad.

♀. Vaginal plate almost wholly membranaceous, wrinkled, covered with scales laterally to the mouth of the vagina, which is antemedian, the anterior margin of the opening not produced into a prominent ridge or flap, and therefore the mouth of the vagina more or less free.

Larva with two high processes on the second and third thoracic segments, a dorsal mesial line and seven oblique lateral lines of tubercles composed of aggregate granules; head somewhat narrowed above, granulose behind; horn densely covered with high granules.

Hab. Atlantic Subregion, Canada to Georgia, westward to the Missouri basin.

In the Tring Museum several larvae, pupae, and 6 ♂♂, 15 ♀♀.

80. Ceratomia undulosa.

Mavrosila brontes (?), Walker (*non* Drury, 1773), *List Lep. Ins. B.M.* viii. p. 199. n. 1 (1856) (syn. excl.; U. States).

Daremma undulosa id., *l.c.* viii. p. 231. n. 1 (1856) (Orilla, W. Canada); Clem., *Journ. Ac. Nat. Sci. Philad.* iv. p. 186. n. 91 (1859) (cop. from Walk.); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. N. Am. Lep.* p. 214 (1862); Bowl., *Canad. Ent.* iii. p. 143 (1871) (Quebec, vi.—vii.); Lint., *Ent. Contr.* i. p. 192. & iii. p. 179 (1872) (N. York, vi.); Thaxt., *Psyche* i. p. 30 (1874) (Mass., M. vi.—B. vii.); Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 24 (1874); id., *l.c.* ii. p. 227. n. 48 (1875); id., *l.c.* iii. p. 224. n. 48 (1877) (Conn.; Mass.; N. York; Penn.); Caulf., *Canad. Ent.* vii. p. 241 n. 12 (1875) (Montreal, rare); Butl., *Trans. Zool. Soc. Lond.* ix. p. 611 (1877) W. Canada; U. St.); Andr., *Psyche* ii. p. 73 (1877); Worth., *Canad. Ent.* x. p. 16 (1878) (Chicago, *l.* on black ash, viii. ix.); Hulst, *Bull. Brookl. Ent. Soc.* ii. p. 35 (1879); Coq., *Trans. Dept. Agr. Illin.* xviii. App. p. 159 (1880); Reed, *Rept. Ent. Soc. Ont.* xii. p. 64 (1882) (larva); Pil., *Papilio* ii. p. 66 (1882) (Dayton, O., 1 ♂); Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine, common); id., *Sphing. N. Engl.* p. 27. n. 10 (1886) (metam.); Holl., *Canad. Ent.* xviii. p. 102 (1886) (*l.* occasionally on white and on red oak); Grote, *Hawk Moths N. Am.* p. 38 (1886) (Canada to Middle States, vi., viii.); Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 45 (1889) (lit. rel. to metam.); Kirby, *Cat. Lep. Het.* i. p. 683. n. 1 (1892); Cross, *Ent. News* vii. p. 297 (1896) (N. Hampsh., common); Bowl., *Ent. News* v. p. 176 (1894) (*l.* on Ash); id., *l.c.* ix. p. 191 (1898) (Missouri); id., *l.c.* x. p. 12 (1899) Missouri; common; Ash).

Ceratomia repentinus Clemens, *l.c.* p. 180. n. 83 (1859) (Mich.; Conn.; Penn.; N. York); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Grote, *Proc. Ent. Soc. Philad.* v. p. 39 (1865).

Sphinx repentinus, Grote, *Proc. Ent. Soc. Philad.* v. p. 72 (1865).
Daremma repentinus, Grote & Rob., *ibid.* v. p. 164. n. 88 (1865) (Atlantic district).
Sphinx brontes, Boisduval (*non* Drury, 1773), *Spec. Gén. Lép.* i. t. 11B. f. 6 (1836) : id., *l.c. Hét.* i. p. 116. n. 58 (1875) (larva, pupa ; N. York).
Daremma brontes, Marten, *Trans. Dept. Agr. Illin.* xviii. App. p. 102 (1880).
Diludia brontes, Maassen, *Stett. Ent. Zeit.* xli. p. 65 (1880).
Ceratomia undulosa, Smith, *Trans. Amer. Ent. Soc.* xv. p. 203. t. 10. f. 7. 8 (genit.) (1888) (Canada to Virg., westw. to Ill., Missouri, Iowa) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 308. t. 6. f. 7 (1895) (N. York ; vi., viii. ; larva, pupa) ; id., *l.c.* viii. p. 296 (1896) (metam. ; Lilac) ; Hanh., *Canad. Ent.* xxix. p. 292 (1897) (Manitoba, vii.) ; id., *l.c.* xxxi. p. 52 (1899) (Manitoba).

♂ ♀. First segment of foretarsus not longer than second (Pl. LXIV. f. 5) ; long terminal spur of hindtibia more than three-fourths the length of the first tarsal segment. Pronotum edged with yellow buff. Stigma large ; antemedian lines of forewing distinct.

♂. Tenth abdominal tergite compressed, curved at end, subcarinate distally above and below, with a short lateral carina at end, dilated ventrad before the hook (Pl. XXVIII. f. 2) ; lobe of sternite longer than broad, rounded truncate at end, sinuate, margins turned upwards, so that the lobe is concave above, convex beneath (Pl. XXVIII. f. 3). Clasper broadly sole-shaped, deeply concave ; harpe resembling that of *Isogramma hageni*, produced ventro-distally into a pointed process ; the distal and dorsal edge of the somewhat concave upper part of the harpe denticulate, the scaling on the surface of the harpe not very dense (Pl. XL. f. 2). Penis-sheath armed with an apical horizontal tooth which is beset with sharp teeth at the distal and proximal edges, the dentition extended proximad along the edge of the stronger chitinised part of the sheath (Pl. XXIX. f. 1) ; this armature of the penis-sheath is peculiar to *undulosa*.

♀. Vaginal plate (Pl. XXI. f. 1) proximally limited by a rounded ridge ; month of vagina covered by a prominent ridge which is produced distad at each side into a long, broad, apically rounded, lobe ; this ridge surrounds the vaginal opening in front and at the sides, and forms the roof of a large cavity.

Larva light green, with seven oblique greenish white side-bands ; stigmata red ; body almost smooth ; anal segment with black granules ; head obtusely triangular. Sometimes the underside and large patches in front of the side-bands red. —Food-plants : *Fraxinus*, *Ligustrum*, etc.

Pupa more stumpy than that of *amyntor*, less glossy, especially the wing-cases ; more distinctly multicarinate near spiracles ; tongue shorter than forelegs.

Hab. Atlantic Subregion : Canada to Virginia ; westward to the Mississippi basin.

In the Tring Museum several larvae and pupae, and 23 ♂♂, 17 ♀♀ from various localities.

81. Ceratomia catalpae.

Sphinx catalpae Boisduval, *Spec. Gén. Lép. Hét.* i. p. 103. n. 42. t. 2. f. 1 (*i.*) 2 (*l.*) (1875) (descr. from figs. of Abbot and note of Leconte) ; Streck., *Lep. Rhop. Het.* p. 142 (1878) ; Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 104 (1880) ; Kent, in Riley, *Ins. Life* iii. p. 338 (1891) (Roxie, Missouri, larva abundant) ; Edw., *Can. Ent.* xxx. p. 7 (1898) (Coalburgh, W. Va.).
Pseudosphinx catalpae, Butler, *Trans. Zool. Soc. Lond.* ix. p. 629 (1877).
Diludia catalpae, Grote, *Bull. Buffalo Soc. N. Sci.* iii. p. 224. n. 52 (1817) (Georgia).
Daremma catalpe, Grote, *Canad. Ent.* x. p. 231 (1878) (Florida !) ; Koeb., *Bull. Brooklyn Ent. Soc.* iv. p. 20 (1881) (egg, larva) ; Riley, *Rpt. U. St. Dept. Agr.* p. 189. t. 13 (1882) (metam.) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 45 (1889) (lit. rel. to metam.) ; Webst., in Riley, *Ins. Life* ii. p. 382 (1890 (larva, Arkansas, v. ; S. Indiana) ; Wall., *Ent. News* ix. p. 23 (1898) (Delaware, *l.*, denuding Catalpa trees).

Ceratomia catalpae, Smith, *Trans. Amer. Ent. Soc.* xv. p. 205. t. 10. f. 9. 10 (genit.) (1888) (Florida to Virginia, Mississippi, Indiana) ; Jones, *Ent. News* x. p. 43 (1899) (Delaware, spreading northward ?) ; Laur., *ibid.* x. p. 190 (1899) (Delaware, abund. of pupa) ; id., *l.c.* xi. p. 608 (1900) (spreading northw.).

♂ ♀. First segment of foretarsus a little longer than second ; long terminal spur of hindtibiae less than two-thirds the length of the first tarsal segment. Markings in basal half of forewing less distinct than in *undulosa*, stigma smaller, bands on underside of hindwing less marked, the outer one not dentate ; collar not edged yellow buff, brown lateral patches of abdomen smaller. The fringe-spots are variable in size.

♂. Tenth abdominal segment not quite symmetrical—the asymmetry is not conspicuous,—tergite less dilated vertically before endt han in *undulosa* ; sternite shorter, the lobe broader than long, sinuate, the right half truncate, the left rounded. Clasper small, narrow, broadest just before end ; harpe short, broad, almost oblong, somewhat narrowing to end, sinuate at apex, the ventral lobe shorter than the upper one, upper margin slanting, dentate (Pl. XL. f. 1). Penis-sheath with a very long, conical, horizontally curved, apical tooth (Pl. XXIX. f. 2. 3).

♀. Vaginal plate resembling that of *Isogramma hageni*, but the ridge covering the vaginal cavity thicker and less distinctly sinuate.

Southern specimens seem to be duller in colour and less distinctly marked than northern ones, and have on the metanotum an obvious yellowish spot, which is much paler in northern examples.

Larva pale green, black above, with pale green dorso-lateral stripe, which is interrupted, ringlets and joints also partly pale green ; head black ; horn thin, black.—Food-plant : *Catalpa*.

Pupa slender, glossy, not strongly sculptured.

Hab. Southern district of Atlantic Subregion : Florida to Delaware, westward to Mississippi and Pennsylvania.

In the Tring Museum a number of larvae and pupae, and 9 ♂♂, 13 ♀♀ from : Florida ; Virginia ; Pennsylvania.

XXVIII. ISOPARCE gen. nov.—Typus : *eupressi*.

Sphinx, Boisduval (*non* Linné, 1758), *Spec. Gén. Lép. Hét.* i. p. 102 (1875).
Hyloicus, Grote (*non* Hübner, 1822), *Bull. Buffalo Soc. N. Sc.* iii. p. 225 (1877).

♂. Tongue *very short* and weak, scarcely reaching midcoxae. Palpus small, rough-haired. Tibiae *not* spiny ; first segment of foretarsus short, somewhat longer than second, not obviously longer than fifth, with several stout spines externally, apical one prolonged, segments 2 to 4 also with one prolonged externo-apical spine ; hindtibia shorter than first tarsal segment ; spurs very long, long terminal one of the length of the first tarsal segment ; *no* comb to midtarsus ; *no* pulvillus, paronychium *without* lobes. R^2 of hindwing before centre of cell, SC^2 and R^1 on a long stalk.

♂. Tenth abdominal tergite slender, curved, carinate above, apex obtuse in dorsal, acute in lateral, view ; sternite (Pl. XXVIII. f. 6) broad, triangular, obtuse, sinuate, convex below. Clasper short and broad, subdorsal fold heavy, with long bristles ; harpe (Pl. XL. f. 4) consisting of an upper, truncate, dentate, concave

lobe, and a ventro-distal, flat, somewhat concave, obtuse process. Penis-sheath (Pl. XXVIII. f. 55) produced into a flat apical process.

♀ Unknown to us.

Larva (accord. to Boisduval's figure) : green, middle of tergites (except first two) red, sides with two rows of white patches.

Pupa (accord. to Boisd.) without free tongue-case.

Hab. Southern Atlantic States.

The species shares with *Atreus plebeja* the short first protarsal segment and the long spurs to the hindtibia, with *Hyloicus* the absence of a pulvillus and the structure of the sexual armature, with *Ceratomia* the absence of spines from the tibiae, absence of a pulvillus, and the short first protarsal segment. A derivation from *Ceratomia*.

82. Isoparce cupressi.

Sphinx cupressi Boisduval, *l.c.* n. 41. t. 2. f. 3 (*i.*) 4 (*l.*) 5 (*p.*) (1879) (Georgia); Edw., *Canad. Ent.* xix. p. 146 (1887) (Kissimee & Enterprise, Florida, May); Smith, *Trans. Amer. Ent. Soc. Lond.* ix. p. 195 (1888 (Georgia; Florida).

Hyloicus cupressi, Grote, *Bull. Buffalo Soc. N. Sc.* iii. p. 225. n. 75 (1877) (Georgia); Kirby, *Cat. Lep. Het.* i. p. 694. n. 17 (1892).

♂. This almost uniformly brown insect is easily recognised by the nearly longitudinal black double line which runs on the forewing from R^3 to M^2.

Rare in collections. The two specimens recorded by Edwards were caught in May; as they were rubbed, Edwards concludes that the species emerges from the chrysalis earlier in the year.

Hab. Georgia; Florida.

One damaged ♂ without locality in the Tring Museum; also a ♂ in the Berlin Museum.

XXIX. NANNOPARCE gen. nov.—Typus : *poeyi*.

Hyloicus, Grote (*non* Hübner, 1822), *Ann. Lyc. N. York* viii. p. 200 (1867).

♂ ♀. Tongue longer than the body; comb of pilifer white, not yellow, the bristles flattened. Antenna of ♀ without prolonged ciliae, slightly but distinctly clubbed. Tibiae *not* spinose; foretarsus as in *Ceratomia* with short first segment which is armed with long spines; midtarsus *with* comb; long terminal spur of hindtibia about four-fifths the length of the first tarsal segment, this shorter than tibia; *no* pulvillus; paronychium with one lobe on each side.

Early stages unknown.

Hab. Cuba; Jamaica; Yucatan.

One species.

The presence of the midtarsal comb, the long tongue, the specialised comb of the pilifer and the slightly clubbed antenna of the ♀ remove this genus from the branch *Chlaenogramma* { *Ceratomia.* / *Isogramma.* It is an independent offshoot from *Protoparce*, being differentiated from it, *inter alia*, by the shortness of the first protarsal segment.

83. Nannoparce poeyi.

Hyloicus poeyi Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 166. n. 100 (1865) (Cuba ; *nom. nud.*) ; Grote, *Ann. Lyc. N. York* viii. p. 200 (1867).

♂. Tenth abdominal tergite long, slender, curved ; sternite (Pl. XXVIII. f. 5) obtusely triangular, sinuate, convex below. Harpe (Pl. XXXV. f. 28) obliquely rounded at end, dorsal edge sharply dentate, concave ; a patch of suberect scales on the surface of the harpe. Penis-sheath with a short flat process which is notched at end (Pl. XL. f. 13).

♀. Orifice of vagina (Pl. XXI. f. 13) proximal, covered by a triangularly sinuate flap ; behind the orifice there is a very long rod-like tubercle, similar to that found in *Hyloicus lanceolata*.

Hab. As above.

We have not seen a Cuba specimen, but the two Jamaica specimens (or, to be more correct, one specimen and four wings) agree so well with Grote's description that we have no doubt about the correctness of our identification as regards the species. Whether Jamaica and Cuba individuals are subspecifically different, that is a question which we cannot decide without Cuba material.

a. N. poeyi poeyi.

Hyloicus poeyi Grote, *l.c.* ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 617. n. 8 (1877) ("Atlantic district" ; "1863" ex err.) ; Gundl., *Contr. Ent. Cubana* p. 227 (1881) (Santiago, Cuba) ; Kirby, *Cat. Lep. Het.* i. p. 694. n. 13 (1822) (Cuba ; "1863" ex err.).
Erinynis poeyi Grote, *l.c.* (sub syn.).

♂. Forewing less variegated with blackish brown than in *haterius*, more elongate. Tenth sternite more deeply sinuate, and harpe more densely dentate.

Hab. Cuba ; Jamaica.

A ♂ in the Dublin Museum, without antenna but otherwise in fair condition ; another in the Berlin Museum with wrong head and abdomen. The latter individual has on the forewing a large brown costal mark in the shape of a halfring open at costal margin.

b. N. poeyi haterius.

Hyloicus haterius Druce, *Ann. Mag. N. H.* (6.) ii. p. 239 (1888) (Yucatan ;—coll. Staudinger) Kirby, *Cat. Lep. Het.* i. p. 694. n. 18 (1892) ; Druce, *Biol. Centr. Amer., Lep. Het. Suppl.* p. 318. n. 1. t. 65. f. 5 (1896) (Temax, N. Yucatan).

♂ ♀. Forewing variegated with blackish brown, especially on disc and at costal margin.

♂. Tenth sternite minutely sinuate.

Hab. Yucatan.

In Museum Tring 1 ♀ ; in the British Museum 1 ♂ ; also in the coll. of H. Druce and Staudinger.

XXX. DICTYOSOMA gen. nov.—Typus : *elsa*.

Sphinx, Strecker (*non* Linné, 1758), *Lep. Rhop. Het.* p. 126 (1878).

♂ ♀. Tongue shorter than the body. Pilifer with bristles and scales. Palpus slender, not prominent, hairy. Eye small, not lashed. Antenna (♂, ♀) stout,

with very short abrupt hook, segments constricted at base, appearing dilated laterad in a dorsal aspect, rather broad ventrally; the ventral portions being shorter than the stem of the segments, there is an interspace between the segments ventrally. Tibiae *without* spines: foretibia short, barely three times as long as broad; first segment of foretarsus about as long as the tibia, with three long spines, besides an additional basal one, no small spines externally, second segment with two prolonged spines; *no* comb to midtarsus; hindtibia longer than the first tarsal segment, this shorter than the four others together; spurs of mid- and hindtibiae very short, the proximal pair of hindtibia about as long as the tibia is broad. Pulvillus *absent*; paronychium reduced, *without* elongate lobes. Cross-veins of hindwing very oblique.

♂. Tenth abdominal tergite stout, curved, pointed, convex above; sternite broad, the lobe slightly spatulate, irregularly rounded. Clasper short and broad, broadly rounded (Pl. XXXIX. f. 8); harpe produced into a long pointed process, which curves upwards. Penis-sheath produced into a short, slender, conical, acute, slightly curved process of the *Hyloicus* type (Pl. XXVIII. f. 44).

♀. Vaginal orifice subapical (Pl. XX. f. 21), with a short, broad, sinuate lobe in front.

Larva green, somewhat granulose, with six reddish brown oblique side-stripes, which are edged with pale yellow behind.

Pupa not described, probably without free tongue-case.

An isolated species, wrongly associated generically with *Hyloicus drupiferarum*, *vancouverensis*, etc.

Hab. Arizona.

One species.

84. Dictyosoma elsa.

Sphinx elsa Strecker, *l.c.* p. 126. t. 14. f. 4 (♂). 5 (♀) (1878) (Arizona, in coll. Streck. ♂, & Neumoeg. ♀); Smith, *Trans. Amer. Ent. Soc.* xv. p. 189 (1888) ("tibiae sparsely spinose" ex err. !); Edw., *Ent. Amer.* iv. p. 61 (1888) (larva); id., *Bull. U. St. Nat. Mus.* xxxv. p. 48 (1889) (lit. rel. to metam.); Kirby, *Cat. Lep. Het.* i. p. 692. n. 22 (1892) (Arizona).

♂ ♀. All the specimens in collections have apparently come from the same locality in Arizona. The species occurs possibly in N.W. Mexico.

Hab. Arizona.

In the Tring Museum 1 ♂, 1 ♀; in coll. Schaus 1 ♂; in coll. Staudinger 1 ♂, 1 ♀.

XXXI. NEOGENE gen. nov.—Typus: *reeci*.

Hyloicus Hubner (*non* id., 1822), *Samml. Ex. Schm.*, *Zutr.* (1825 ?).
Gargantua Kirby, *Cat. Lep. Het.* i. p. 692 (1892) (partim).
Sphinx, Auct.

♂ ♀. Antenna very stout in ♂, nearly one-half the length of the forewing, abruptly hooked; distinctly clavate in ♀, simple, not quite one-third the length of the forewing. Tongue shorter than the body, weak. Pilifer with a brush of *scales* instead of bristles. Genal process much longer than the pilifer. Palpus applied to the head, not prominent, larger in ♂ than in ♀. Eye lashed. Tibiae

not spinose, longer than the respective first tarsal segment; first segment of foretarsus about three times as long as broad, armed with three long spines, second segment with one long apical spine ; midtarsus generally with two or three long bristles indicating the comb ; first segment of mid- and hindtibia shorter than the four others together; long apical spur of hindtibia not half the length of the first tarsal segment ; no spines on the upperside of the tarsi ; paronychium *present*, the lobe long but very slender ; *no* pulvillus. Spinulation of abdomen weak.

Early stages not known.

Hab. Southern Neotropical Region.

The genus is a dwarfed offshoot from *Protoparce*, parallel with the series *Chlaenogramma—Ceratomia*. It has acquired, like *Ceratomia*, the short and strongly armed foretarsus, lost the pulvillus, and preserved the unarmed tibiae. The presence of some long bristles indicating the comb on the midtarsus proves *Neogene* to have branched off independently of *Chlaenogramma*, in which the comb is entirely reduced to the ordinary spinulation, while in the modification of the bristles of the pilifer into scales *Neogene* is even more advanced than *Ceratomia*, which has the normal brush of bristles. It belongs to the *Nannoparce* branch, forming a more specialised member of that series, which terminates in the Australian *Coenotes*.

Two species :

Occiput white like the sides of pro- and mesonotum 86. *N. dynaeus*.
Occiput black like the sides of pro- and mesonotum 85. *N. reevi*.

85. **Neogene reevi.**

**Hyloicus reevi* Druce, *l.c.* (1881) (Paraguay ;—coll. Druce) ; Kirby, *Cat. Lep. Het.* i. p. 695. n. 20 (1892).
Sphinx baruta Berg, *An. Soc. Cient. Argent.* xv. p. 151 (1883) (Buenos Ayres).
Gargantua baruta, Kirby, *l.c.* p. 693. n. 5 (1892) (Buenos Ayres).
**Sphinx cossoides* Rotbschild, Nov. Zool. i. p. 94. t. 7. f. 22 (1894) (Castro, Parana ;—Mus. Tring).
Sphinx reevi, Schaus, *Ent. News* vi. p. 143 (1895) (=*baruta*=*cossoides*).

♂ ♀. The disc of the hindwing more shaded with brown in the ♀ than in ♂, in the latter mostly the veins only brown. The width of the black border of the hindwing is not constant.

♂. Tenth abdominal tergite strongly compressed, narrow above, parallel in dorsal view from the middle to the end, the tip obtuse ; tapering in side-view, with the tip acute ; underside carinate ; lobe of sternite rounded, slightly spatulate, about as long as broad, sinuate. Clasper broad, widest beyond middle, dorsal margin rather strongly dilated-rounded ; harpe (Pl. XXXVIII. f. 16) triangular, produced ventro-distally, obliquely rounded distal margin dentate. Penis-sheath with a long, conical, curved, horizontal tooth at end.

♀. Eighth abdominal tergite rounded-truncate at end, not sinuate ; sternite triangular, separated laterally from the tergite by the pleural membrane ; vaginal cavity transverse, with a short, wrinkled, semi-membranaceous ridge in front, covered with scales.

Hab. Argentina ; Paragnay ; Parana, Brazil.

In the Tring Museum 9 ♂♂, 3 ♀♀ from : Castro, Parana, Nov. Dec. (E. D. Jones) ; La Gama, Argentina, Nov. Dec. ; Cordoba (Berg).

86. Neogene dynaeus.

Hyloicus dynaeus Hubner, *l.c.* 5. p. 19. n. 232. f. 463. 464 (1825?) (Bahia); Kirby, *Cat. Lep. Het.* i. p. 695. n. 19 (1892) (Bahia).
Sphinx dryneus (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 98. n. 35 (1875) (Pernambuco).

♂. The chalky white colour of the occiput and sides of pro- and mesonotum distinguish this species conspicuously from *reevi*. The forewing has an oblique, grey, more or less interrupted, apical band which joins as a rule the grey transverse discal band. The hindwing is more or less suffused with brown; the brown marginal band is not sharply defined. No long bristles at the base of the midtarsus, or only one or two.

♂. Sexual armature essentially as in *reevi*, but the tooth of the penis-sheath longer.

♀. Not seen.

Hab. Brazil: Bahia, Pernambuco.

In the Tring Museum 3 ♂♂ from Pernambuco, received from Mr. Schaus.

XXXII. COENOTES gen. nov.—Typus: *eremophilae*.

Sphinx, Lucas (*non* Linné, 1758), *Queenslander* xxxix. p. 894 (1891).
Protoparce, Miskin (*non* Burmeister, 1856), *Proc. Roy. Soc. Queensl.* viii. p. 24 (1891).

♂♀. Closely allied to *Neogene*. Antenna much slenderer, palpus smaller, tongue shorter and weaker, midtarsus without the long basal bristles, R^2 of the hindwing a little more central, the lobes of the paronychium much shorter; eye not lashed.

Larva grey sage green; head, anal prolegs and horn black; three rows of orange spots, one dorsal, two lateral, the latter including the stigmata; horn long and thin (from a drawing by Miss Barnard).—Food: *Eremophila*.

Tongue-case of pupa not free.

Hab. Queensland.

One species.

87. Coenotes eremophilae (Pl. XII. f. 8, ♂, *type*).

**Sphinx eremophilae* Lucas, *l.c.* (May 1891) (Dawson;—Mus. Tring); Misk., *Proc. Roy. Soc. Queensl.* viii. p. 64 (1891) (=*minimus*); Luc., *Proc. Linn. Soc. N. S. W.* (2). vi. p. 278 (1891).
Protoparce minimus Miskin, *l.c.*, p. 24 (1891) (Dawson).
Phlegethontius (?) *eremophilae* Kirby, Nov. Zool. i. p. 38. n. 43 (1894).

The *type* of this species is in the Tring Museum, ex coll. Barnard, from which collection Lucas described the insect. Miskin's *minimus* came from the same source.

♂. Tenth tergite shorter and more strongly curved than in *Neogene*, strongly convex dorsally at apex; sternite truncate-sinuate, a little longer than broad, with the angles rounded. Harpe very short, rounded-triangular, denticulate at end, without a patch of erect scales (which patch is present in *Neogene*, *Protoparce*, etc.). Penis-sheath defective in the only ♂ at disposal, apparently without armature.

♀. Vaginal plate smooth distally, proximal three-fourths membranaceous, vaginal orifice antemedian.

Hab. Dawson River, Queensland (Barnard coll.).

In the Tring Museum 1 ♂, 1 ♀ ex coll. Barnard, *type*.

XXXIII. ATREUS.—Typus : *plebeja*.

Sphinx, *Fabricius* (*non* Linné, 1758), *Gen. Ins.* p. 273 (1777).
Anceryx Walker, *List Lep. Ins. B. M.* viii. p. 224 (1856) (partim ; type : *pinastri*).
Hyloicus, Grote & Rob. (*non* Hübner, 1822), *Proc. Ent. Soc. Philad.* v. p. 166 (1865).
Atreus Grote, *Hawk-Moths N. Am.* p. 41 (1886) (type : *plebeja*).

♂ ♀. Tongue long. Eyes lashed. Comb of pilifer normal. Fore- and mid-tibiae *spinose*, spines not numerous ; two of the apical spines of foretibia long, no spines on anterior surface, first segment of foretarsus with two or three long spines, much shorter than the tibia, half as long again as second segment ; hindtibia about as long as the first tarsal segment, spurs very long, long apical one reaching end of first tarsal segment ; comb of mesotarsus present, consisting of a few long bristles which stand in basal fifth of the segment ; pulvillus and paronychium *present*. Antenna gradually tapering from middle to end, segments in ♀ with distinct basal rows of prolonged ciliae. R^2 of hindwing in or before centre of cell.

♂. Tenth abdominal tergite as in *Protoparce quinquemaculatus* ; lobe of sternite flat, rounded, rather obviously sinuate (Pl. XXVIII. f. 8), agreeing with the sternite found in some *Hyloicus*. Clasper rather slender, not dilated dorsad ; harpe (Pl. XXXV. f. 26) with a patch of erect scales as in *Protoparce*. Penis-sheath as in *Protoparce*, with an apical horizontal tooth, which points to the right-hand side.

♀. Vaginal plate semi-membranaceous, mouth of vagina very wide, its proximal edge sharp, but not, or little, raised above the level of the postvaginal portion of the plate (Pl. XXI. f. 19).

Larva green, paler above or pinkish, seven yellow side-bands, bordered black or red in front ; horn with numerous black granules ; head rounded, very little narrowed above, granulose all over ; thorax with dispersed granules, a transverse row anteriorly on prothorax and a dorso-lateral series on meso-metathorax more distinct.

Pupa : tongue-case detached, straight, closely applied to the breast, long, reaching to the end of the antenna-case.

Hab. Eastern parts of the Nearctic Region.

Two species.

An offshoot from *Protoparce*, or rather from a form (not yet discovered, or extinct) connecting *Protoparce* with *Hyloicus*.

88. Atreus plebeja.

Sphinx plebeja Fabricius, *Gen. Ins.* p. 273. n. 16-17 (1777) ("St. Cruz I." err. loc.) ; id., *Spec. Ins.* ii. p. 146. n. 31 (1781) ("Amer. merid. insul." err. loc.) ; id., *Mant. Ins.* ii. p. 95. n. 34 (1787) ; id., *Ent. Syst.* iii. 1. p. 367. n. 36 (1793) ; Gmel., *Syst. Nat.* i. 5. p. 2385. n. 91 (1790) (*loc. err.*); Steph., *Illustr. Brit. Ent., Haust.* i. p. 122 (1828) ; Harr., in Sill., *Journ. Sci. Art* xxxvi. p. 296. n. 9 (1839) (N. Carolina) ; Wood, *Ind. Ent.* p. 246. t. 53. f. 27 (1839) ; Clem., *Journ. Ac. Nat. Sci. Philad.* iv. p. 170. n. 66 (1859) (Penn. ; Conn. ; Mass.) ; Morris, *Cat. Lep. N. Am.*

p. 18 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 195 (1862) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 99. n. 37. t. 1. f. 3 (*l.*) (1875) (Georgia ; Florida ; *non* "Antilles") ; Pil., *Papilio* ii. p. 66 (1882) (Dayton, O., rare).

Ancyrx plebeia, Walker, *List Lep. Ins. B. M.* viii. p. 224. n. 3 (1856) (U. St. ; cit. Hübn. excl.).

Hyloicus plebeia, Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 166. n. 99 (1865) (Atlantic district); Butl., *Trans. Zool. Soc. Lond.* ix. p. 617. n. 6 (1877) (Delaware) ; Kirby, *Cat. Lep. Het.* i. p. 694 n. 9 (1892).

Hyloicus plebeius (!), Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 27 (1874) ; id., *l.c.* ii. p. 228. n. 66 (1875); id., *l.c.* iii. p. 225. n. 68 (1877) (Mass. ; Missouri ; Ohio ; Southern St.) ; Scudd., *Psyche* ii. p. 78 (1877) (larva ; on *Syringa*) ; Fern., *Sphing. N. Engl.* p. 52. n. 23 (1886) (larva ; on *Tecoma*) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 48 (1889) (lit. rel. to metam. ; on *Bignonia*, *Passiflora* !) ; Rowl., *Canad. Ent.* x. p. 11 (1899) (Missouri, larva on *Syringa*, *Tecoma*).

Atreus plebeius (!), Grote, *Hawk Moths N. Am.* p. 41 (1886) (*l.* on *Syringa*).

Sphinx plebeius (!), Smith, *Trans. Amer. Ent. Soc.* xv. p. 194 (1888) (Canada to Florida, westw. to Mississippi) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 305. t. 6. f. 3 (1895) (N. York, vi., E. vii. viii. ; *l., p.*) ; id., *l.c.* viii. p. 295 (1896) (metam. ; on *Tecoma*).

♂ ♀. Harpe (Pl. XXXV. f. 26) strongly dentate, produced ventrad into a broad lobe which ends in a heavy sharp tooth. The black lateral patches of the abdomen have developed to a subdorsal and subventral longitudinal band connected with each other by the black edges of the segments. The development of such bands from patches in this species is of great significance in the study of the development of the pattern of Lepidoptera. It was Eimer's main contention that longitudinal *bands* represent *always* the ancestral pattern, which is erroneous.

Larva on *Syringa* and *Tecoma* ; Boisduval, and later Hy. Edwards, *l.l.c.c.*, gives *Bignonia* and *Passiflora* as food-plants.

Two broods.

Hab. Canada to Florida, westward to Missouri.

In the Tring Museum 10 ♂♂, 12 ♀♀, 3 larvae and 2 pupae from : N. Jersey ; Virginia ; N. Carolina ; Sanford, Florida, June.

XXXIV. HYLOICUS.—Typus : *pinastri*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Hyloicus Hübner, *Verz. bek. Schm.* p. 138 (1822) (partim ; type : *pinastri*).
Lethia id., *l.c.* p. 140 (1822) (partim ; type : *ligustri*).
Agrius id. (*non* id., 1822), *Samml. Ex. Schm.* (1824 ?).
Lintneria Butler, *Trans. Zool. Soc. Lond.* ix. p. 620 (1877) (type : *eremitus*).
Gargantua Kirby, *Cat. Lep. Het.* i. p. 693 (1892) (type : *eremitus*).

♂ ♀. Eye lashed. Foretibia *spinose*. *No* pulvillus. Abdominal segments laterally black at the apex ; white or grey at the base. Harpe without patch of suberect scales ; penis sheath produced distad into a simple or hooked process.

A large genus, comprising forms which differ considerably in structure, but are connected by intergraduate species.

Tongue much longer, or shorter, than the body. Palpus more or less rough, with long hair-scales. Antenna of ♀ without distinctly prolonged seriated ciliae, often obviously clubbed. Foretibia always armed with spines, but the spines quite variable in number and size, midtibia unarmed, or with one or a few apical spines regularly or occasionally, or more or less spiny all over ; spurs often with one or more spines (*vancouverensis*, *eremitus*, etc.) ; first protarsal segment variable in length, often armed with prolonged spines ; midtarsal comb

present, or reduced in the number and length of the bristles, or the bristles not prolonged to a comb; pulvillus always absent, but the lobe of the paronychium may be present or absent.

The more generalised species with paronychium, mesotarsal comb, very long tongue, long first protarsal segment and *not* spiny midtibia, are *lugens* and allies. From this group *eremitus* branched off by acquiring the short first protarsal segment, the spiny midtibia and the specialised larva. Another branch (*canadensis*, etc.), had its origin in some such form as *justiciae*; while *lanceolata* may be regarded as the prototype of the more specialised *ehersis*, *vancouverensis* and allies. This latter series, of which *sequoiae* and *coloradus* with their clubbed ♀-antenna and the peculiar genital armature form a side-branch, culminates in forms without paronychium and without midtarsal comb.

In two of the species (*vancouverensis* and *perelegans*) remarkable dichromatism obtains, there occurring specimens with a black and specimens with a grey thorax. The difference is said to be seasonal in *vancouverensis* (see below).

We were very much surprised to find that, in *perelegans*, this difference in colour is accompanied by a difference in structure, the one form possessing long lobes to the paronychium, the other being without them. This is the first instance met with by us among *Lepidoptera*—apart from *geographical* races—where individual resp. seasonal forms differ in structure as well as in colour.

We should have liked to divide the rather unwieldy mass of species at least into three genera. Our attempts, however, to do so were a failure. The species with non-spinose midtibiae and long lobes to the paronychium form a natural group, if we except *lanceolata*, but the remainder comprises species which are partly much less related *inter se* than with species of the first group, and would require further splitting up, if the first group were treated as generically distinct.

Larvae of the *ligustri*-type, or specialised in pattern and sometimes in structure.

Pupa with a free tongue-sheath of varying length, appressed to the breast.

Hab. Nearctic, Neotropic, and Palaearctic Regions.

Thirty species, of which only four are Palaearctic.

Key to the species:

1. Midtibia not spinose; paronychium with lobes. Hindwing with a black basal patch. Forewing generally with two distinct stigmata.		
a. Mesothoracic tegulae with a black middle line besides the thin black dorsal border		*b*.
Mesothoracic tegulae without black middle line .		*i*.
b. Metanotum with a golden-yellow spot on each side .		*x*.
„ without „ „ „ „ „ .		*c*.
c. Fringe of abdominal tergites with a yellow double spot	92.	*H. justiciae*.
Fringe of abdominal tergites without yellow spots .		*d*.
d. Middle of abdominal tergites of a yellowish russet tint, forewing washed all over with russet . .	93.	*H. merops*.
Middle of abdominal tergites olive or grey, ground colour of forewing grey		*e*.
e. Edge of prothoracical tegulae yellow dorsally . .	98.	*H. separatus*.
„ „ „ not yellow dorsally .		*f*.

f. Length of forewing 50 mm. or more, ground colour whitish grey . . . . . *g*.
Length of forewing 45 mm. or less, ground colour brownish grey . . . . . *h*.
Length of forewing 45 mm. or less, ground colour whitish grey, the two lines of the mesothoracic tegula of nearly the same width, the interspace whitish grey . . . . . 97. *H. eremitoides*.
g. Interspace between the two lines on the tegula blackish grey, darker than the disc of the mesonotum . . . . . 99. *H. istar*.
Interspace between the two lines of the same pale grey colour as the disc of the mesonotum . . 100. *H. praelongus*.
h. Abdomen beneath with a series of conspicuous black patches . . . . . 95. *H. geminus*.
Abdomen beneath with one conspicuous patch, the others absent or minute . . . . . 94. *H. lugens*.
i. Mesothoracic tegula without black dorsal border, metanotum with two yellow spots; whitish grey bands of hindwing extended to costa . . . *j*.
Mesothoracic tegulae with black dorsal border, metanotum without yellow spots, grey bands of hindwing not extended to costa . . . . 101. *H. lanceolata*.
j. Body and forewing blackish grey . . . . 90. *H. maura*.
„ „ greenish olive-buff . . . 89. *H. arthuri*.
B. Midtibia spinose, hindwing with sharply defined black basal patch; first protarsal segment only a little longer than the second, with long spines . . . . 96. *H. eremitus*.
C. Midtibia spinose, or paronychium without lobes. Hindwing without black basal patch, or this patch indistinct, ill-defined. Forewing with one stigma, which is often absent.
k. Hindwing almost unicolorous, without sharply marked black distal band . . . . *t*.
Hindwing with a sharply marked distal band, besides a black median band . . . . . *l*.
l. Abdomen with red or reddish side-patches . . 112. *H. ligustri*.
„ without red tint . . . . . *m*.
m. Forewing without white fringe-spots . . 103. *H. rancourerensis*.
„ with „ „ , at least below . *n*.
n. Forewing yellowish buff; mesothoracic tegulae with two stripes, the upper thinner than the lower, space between them russet, paronychium with long lobes . . . . . 108. *H. kalmiae*.
Not so . . . . . *o*.
o. Disc of mesonotum whitish or clayish grey, or somewhat russet, paronychium without lobes . . *p*.
Disc of mesonotum black, at least in frontal half . *r*.
p. Mesothoracic tegulae without a thin middle line . 102. *H. chersis*.

Mesothoracic tegulae with a thin middle line besides the dorsal border . . . . . *q*.

q. Ground colour of forewing and thorax clayish 106. 107. *H. franeki* and *canadensis*.

Ground colour of forewing and thorax greyish white, white side-spots of abdomen bordered with black all round . . . . . 104. *H. libocedrus*.

Ground colour as before, white side-spots of abdomen not bordered black above and below . 105. *H. perelegans f. asellus*.

r. Paronychium without long lobes, black discal band of hindwing below absent or vestigial . . 110. *H. luscitiosa*.

Paronychium with long lobes; the band distinct; pale side-patches of abdomen not bordered with black below . . . . . 109. *H. gordius*.

As before, the side-patches with black border below. *s*.

s. Pale side-patches of abdomen bordered above by a broad black longitudinal band . . . 111. *H. drupiferarum*.

The dorso-lateral black band not present 105. *H. perelegans* f. *perelegans*.

t. Long terminal spur of hindtibia two-thirds the length of the first tarsal segment . . . . 116. *H. pinastri*.

Long terminal spur of hindtibia less than half the length of the first tarsal segment . . . *u*.

u. Midtibia with spines . . . . . *v*.

Midtibia without spines, or only with one or two at end . . . . . *w*.

v. Forewing whitish grey in costal region, this area bordered by a black and brown basi-apical band 113. *H. dolli*.

Forewing more uniform in colour . . . . 114. *H. sequoiae*.

w. Abdomen with greyish white side-patches; two lines across apex of cell of forewing, oblique apical line and discal streaks very heavy . . . 115. *H. crassistriga*.

Abdomen with greyish white side-patches, markings of forewing very thin or ill-defined . . . 118. *H. oberthueri*.

Abdomen with brownish grey side-patches, one line across apex of cell of forewing (this line often obliterated) . . . . . 117. *H. caligineus*.

x. Mesothoracic tegula with black mesial line . . 91. *H. aurigutta*.

„ „ without „ „ . . *y*.

y. Forewing above greenish olive-buff . . . . 89. *H. arthuri*.

„ „ blackish grey . . . . . 90. *H. maura*.

89. Hyloicus arthuri.

**Sphinx arthuri* Rothschild, Nov. Zool. iv. p. 307 n. 1. t. 7. f. 1 (♂) (1897) (La Paz;—Mus. Tring).

♂. Easily recognised by the peculiar greenish olive-buff colour of the upperside of the head, thorax, and forewing. Spines of foretibia not very prominent (the only specimen known has no middle and hind legs). Harpe broad (Pl. XXXVIII. f. 2), concave, and dentate. Membranaceous lobes protruding from the penis-sheath more heavily denticulate than in the other species.

♀. Unknown.

Larva and chrysalis unknown.

Hab. La Paz, Bolivia, 1 ♂ at the electric light (Mus. Tring).

Not seen in other collections.

90. **Hyloicus maura** (Pl. XI. f. 5, ♀).

Sphinx maura Burmeister, *Descr. Rép. Argent. V. Atlas* p. 57 (1879) (Tucuman;—Mus. Buenos Ayres); Kirby, *Cat. Lep. Het.* i. p. 691. n. 11 (1892) (Tucuman).

♀. We have only 2 ♀♀, and there was no other material in the collections visited. This may be the other sex of *arthuri*; but considering the great similarity in pattern between *separatus* and *eremitoides*, *lugens* and *geminus*, it would be very hasty to put *arthuri* and *maura* together as the sexes of one species. The question can only be decided by the study of ♂♂ of *maura* from Tucuman. The two insects agree in the peculiar shape of the forewing, the outer margin of the same being slightly convex, nearly straight down to R^3. The head and thorax are uniform in colour, without black stripes in both species; however, whereas these parts as well as the forewing are blackish grey in *maura*, they are greenish olive-buff in *arthuri*. The underside of the abdomen of *maura* is less white than in *arthuri*, and the white fringe of the hindwing is distinctly spotted with brown. Both species have two golden-yellow spots on the metanotum, one at each side.

Vaginal plate similar to that of *separatus*, distally more rounded, the cavity also more rounded, the cone bearing the vaginal orifice rather high, obliquely truncate, the ventral margin projecting.

Early stages unknown.

Hab. Tucuman and Espirito Santo. In Mus. Tring 2 ♀♀ from: Tucuman, cotype; Espirito Santo (from Herr Fruhstorfer).

The specimen labelled Espirito Santo has a double stigma on the forewing, while the anterior spot is wanting in the cotype, which we received from Professor Carlos Berg.

91. **Hyloicus aurigutta** spec. nov. (Pl. XI. f. 4, ♂).

♂♀. Similar to *lugens*, larger, less grey, wings and body (abdomen excepted) washed with Vandyke brown. Metathorax with two golden yellow spots. Wings, *upperside*.——Forewing: black markings not very distinct on the dark ground; an indistinct russet patch behind cell proximally of oblique antemedian double line; white double stigma rather prominent; oblique apical line thin, widely interrupted at SC^5; postdiscal line R^2—SM^2 interrupted at veins, nearly straight, followed by a greyish white, irregular, submarginal line, which is, taken as a whole, parallel to margin.——Bands of hindwing less white than in *lugens*, being washed with brown like the abdominal bands; black basal patch not quite reaching base, antemedian grey band curved as in *merops*, black discal band much widened from (SM^1) to R^3, including a grey patch before M^2 and a smaller one at SM^2. Palpus and sterna with a few grey scales.

♂. Tenth abdominal tergite broad in proximal half, very abruptly narrowed in middle, apex slenderer than in *lugens*, sternite longer and slenderer than in that species. Harpe (Pl. XXXVIII. f. 3) ending in a heavy tooth, dorsal edge heavily toothed, ventro-distal edge faintly notched. Process of penis-sheath of the same type as in *lugens*, but broader.

♀. Not dissected.

Early stages unknown.

Hab. Chanchamayo, Peru (Thamm); 1 ♂ received from Messrs. Staudinger & Bang-Haas; 1 ♀ from Yungas, La Paz, Bolivia, 14. xii. 99 (Garlepp). Also in the Staudinger collection.

Easily distinguished from *maura* by the black thoracic stripes, and the much more distinctly marked forewings, from *lugens* and allies by the golden metathoracic spots.

92. Hyloicus justiciae.

**Sphinx justiciae* Walker, *List Lep. Ins. B. M.* viii. p. 220. n. 12 (1856) (Rio de Janeiro;—Mus. Brit.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 88. n. 23 (1875) (=*anteros*; Rio de J.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 619. n. 9 (1877) (Rio de J.); Burm., *Descr. Rép. Argent.* v. p. 324. n. 4 (1878) (Buenos Ayres; N. Friburgo; descr. of larva); id., *l.c. Atlas* p. 30. t. 11. f. 3 (*l.*) (1879); Kirby, *Cat. Lep. Het.* i. p. 691. n. 12 (1892); Schaus, *Ent. News* vi. p. 143 (1895) (=*anteros*).

Sphinx anteros Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 131. n. 1478. t. 12. f. 1 (1857) (N. Friburgo); Butl., *l.c.* n. 10 (1877); Kirby, *l.c.* n. 13 (1892).

♂ ♀. Fringe of abdominal tergites orange yellow near the mesial line.

♂. Harpe resembling somewhat that of *lugens*, not serrate, with one apical tooth (Pl. XXXVIII. f. 1); tenth sternite rounded triangular, middle sinus barely vestigial.

♀. Not dissected.

Larva green, with seven side-bands, which are reddish violet in front, white behind, continued to the next segment, but this prolongation yellow; thorax granulose.—Food: *Justicia*, family *Acanthaceae*.

Pupa mentioned by Burmeister, but not characterised.

Hab. Province of Rio de Janeiro to Buenos Ayres, probably extending farther north.

The species is not mentioned by Bönninghausen in his List of the *Sphingidae* of Rio de Janeiro.

We have only one ♂ in the Tring Museum.

93. Hyloicus merops.

**Sphinx merops* Boisduval, *Cons. Lép. Guat.* p. 73 (1870) (Honduras; Mexico;—coll. Charles Oberthür); Butl., *Trans. Zool. Soc. Lond.* ix. p. 619. n. 11 (1877); Schaus, *Ent. News* vi. p. 143 (1895) (northern form of *justiciae*).

Sphinx lugens, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 87. n. 22 (1875) (*lugens*=*merops* ex err.); Kirby, *Cat. Lep. Het.* i. p. 691. n. 8 (1892) (partim).

Sphinx justiciae, Druce (*non* Ménétriés, 1863), *Biol. Centr. Amer., Lep. Het.* i. p. 23. n. 3 (1883) (common in Centr. Am., Mexico to Panama); id., *l.c. Suppl.* p. 318 (1896); Pitt. & Bioll., *Lep. Het. Costa Rica* p. 12 (1897).

♂ ♀. Fringe of abdominal tergites without orange-yellow spots.

♂. Harpe nearly as in *geminus*, shorter, dorsal and distal margins *dentate*. Lobe of tenth sternite less triangular than in *justiciae*.

♀. Vaginal plate (Pl. XX. f. 24) intermediate between those of *geminus* and *separatus*, more wrinkled than in either species, and the distal lateral margins more slanting.

Early stages of this common insect not described.

Hab. Mexico southward to Ecuador.

In the Tring Museum 60 specimens from : Mexico ; Honduras ; Costa Rica ; Rio Dagua, Colombia (Rosenberg) ; Popayan, Colombia (Lehmann) ; Rio Bamba (Stolzmann). In coll. Charles Oberthür also from Chimbo, Ecuador.

No specimens of either *justiciae* or *merops* have been recorded from the Amazon basin, Surinam and Venezuela. Until material from these regions comes to hand it is not possible to say with certainty whether the two insects are mere representative forms of one species, or are specifically distinct. It is worthy of note that they differ in the harpes in a similar way as *geminus* and *lugens*, *separatus* and *eremitoides*. This is an argument in favour of the specific distinctness of *justiciae* and *merops*, though the argument is by no means conclusive.

94. Hyloicus lugens.

**Sphinx lugens* Walker, *List Lep. Ins. B. M.* viii. p. 219. n. 11 (1856) (Mexico, ♂;—Mus. Brit.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 618. n. 3 (1877) (Oaxaca, partim ;=*andromedae*) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 23. n. 2 (1883) (partim) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 191 (1888) (sub syn.) ; Schaus, *Ent. News* vi. p. 143 (1896) (partim) ; Druce, *l.c. Suppl.* p. 318 (1896) (partim).

Sphinx sordida var. B., Clemens, *Journ. Ac. Nat. Sci.* iv. p. 170 (1859) (Jalapa, *haec spec.*?).

**Sphinx andromedae* Boisduval, *Cons. Lép. Guatemala* p. 74 (1870) (Honduras ; Oaxaca ;—coll. Charles Oberthür) ; id., *Spec. Gén. Lép. Hét.* i. p. 89. n. 24 (1875) (partim).

The types of *lugens* and *andromedae* are the same in the sexual armature as well as in size and pattern. Boisduval's description of *andromedae* of 1875 refers to two species ; his *lugens* of 1875 is not Walker's *lugens*, but Boisduval's *merops* of 1870. Clemens's *sordida* var. B. is either *lugens* or *geminus* ; his var. A. is the insect which was formerly identified, erroneously, as *leucophaeata*, and more recently, also by mistake, as *andromedae*. The synonymy becomes still more involved by the American entomologists sinking two separate species, namely, *separatus* and *eremitoides*, as synonyms of *lugens*. The synonymy as given by Smith, *l.c.*, comprises five distinct species.

♂♀. In appearance like an enlarged edition of *eremitus*; first protarsal segment longer, with three or four prolonged spines, of which the apical one is more than one-third the length of the segment. Forewing, above, blackish grey ; there is mostly a longitudinal line in the apex of the cell ; the white dots of the fringe are much smaller than the black spaces between them. Hindtibia as long as the first and second tarsal segments together in ♀, a little shorter in ♂. Black spots of underside of abdomen small, generally only one distinct. Black median band of hindwing narrowing behind, often more or less longitudinally divided by grey scaling.

♂. Tenth abdominal tergite (Pl. XXVIII. f. 7) rather suddenly narrowed in middle, then slightly narrowing to the end, which is rather obtuse, gently bent downward, upperside convex, underside sulcate ; sternite with an obtusely triangular, flat, mesial lobe, which is sinuate and slightly curved upwards. Harpe (Pl. XXXVI. f. 18. 19) non-denticulate, deeply concave on the surface, ventral margin rounded-dilated, distal margin produced at upper angle into a prominent hook ; the subdorsal fold of the clasper with very long bristles. Penis-sheath produced into a slightly curved half-cylinder, which is round at the tip and bears before the end a small sharp tooth (Pl. XXIX. f. 8).

♀. Vaginal plate (Pl. XX. f. 12) longer than in the other species of *Hyloicus* with non-spinose midtibiae, the distal part membranaceous, mesially folded trans-

versely, the folds mesially connected ; orifice of vagina more proximal than in the allies, agreeing in position best with that of *lanceolata*.

Early stages unknown.

Hab. Mexico to Hondnras.

In the Tring Museum 3 ♂♂, 1 ♀ from: Mexico; Rosery Mine, Hondnras, 3000 ft.

95. **Hyloicus geminus** spec. nov. (Pl. XI. f. 3, ♀).

♂♀. This species is so close in pattern to *lugens* that it cannot, with certainty, be recognised as distinct without dissection. It is therefore quite natural that it has been overlooked and stands in collections confounded with *lugens*. The only character by which *geminus* can apparently constantly be separated from *lugens*, apart of the sexual armature, is the presence of five conspicuous black spots on the underside of the abdomen.

♂. Tenth abdominal tergite as in *lugens*; the sternite narrower. Harpe (Pl. XXXVI. f. 20) essentially different, rounded distally, reaching beyond middle of clasper, slightly curved dorsad distally, ventral and dorsal edges almost parallel, dorsal edge heavily dentate, ventro-apical edge less so. Penis-sheath as in *lugens*.

♀. Vaginal plate concave distally (Pl. XX. f. 13), the lateral edges being here raised: orifice of vagina rather large, at each side with a small groove, which is formed by a proximal and a distal fold that are fused together laterally.

Early stages not known.

Hab. Mexico to Honduras.

In the Tring Museum 3 ♂♂, 4 ♀♀ from Mexico: Jalapa, June, *type*, ♀; Tacubaya Mts., August. Also in other collections from various parts of Mexico, especially Vera Cruz.

96. **Hyloicus eremitus.**

Agrius eremitus Hübner, *Samml. Ex. Schm.* ii. t. 166 (1824 ?); Lintn., *Ent. Contr.* i. p. 192 (1872) (N. York, u. vii., larva on spear mint, viii. x.); id., *l.c.* iii. p. 179 (1872) (N. York, vi., larva on mint, ix.); Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 26. n. (1874): id., *l.c.* ii. p. 228. n. 64 (1875) (Mass.; N.Y.; Wisc.; syn. pro parte); Caulf., *Canad. Ent.* vii. p. 241. n. 18 (1875) (Montreal, very rare).

Sphinx sordida Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 296. n. 7 (1839); Walk., *List Lep. Ins. B. M.* viii. p. 219. n. 10 (1856) (U. St.); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 169. n. 65 (1859) (partim; Texas, correct ?); Morr., *Cat. Lep. N. Am.* p. 18 (1860).

Sphinx eremitus, Walker, *l.c.* viii. p. 221 (1856); Lintn., *Proc. Ent. Soc. Philad.* iii. p. 652 (1864) (descr. of *l.*, on mint); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 165. n. 97 (1865) (Atlantic district); Beth., *Canad. Ent.* i. p. 17. n. 21 (1868) (Canada); Glov., *Rept. U. St. Dept. Agr.* fig. (*l.*) (1870); Grote, *Canad. Ent.* iii. p. 101 (1871) (Alabama); Boisd, *Spec. Gén. Lép. Hét.* i. p. 90. n. 25 (1875); Lintn., *Psyche* ii. p. 76 (1877); Fyles, *Canad. Ent.* xi. p. 59 (1879) (Cowansville, P. Q., larva on *Salvia offic.*; quot. Streck. *ex err.*); Pil., *Papilio* ii. p. 66 (1882) (Dayton, O., 1 ♂); Fern., *Sphing. N. Engl.* p. 46. n. 20 (1886) (descr. of larva); Smith, *Trans. Amer. Ent. Soc.* xv. p. 193 (1888) (Canada; Atlantic and Central States); Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 48 (1889) (lit. rel. to metam.); Berry, in Riley, *Ins. Life* iv. p. 206 (1892) (*l.* on mint); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 304. t. 6. f. 2 (1895) (all stages descr.; on *Mentha*, *Monarda*, *Salvia*, etc.); Rowl., *Ent. News* x. p. 11 (1899) (Missouri).

Lintneria eremitus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 620. n. 1 (1877); Grote, *Bull. Buffalo Soc N. Sci.* iii. p. 225. n. 67 (1877) (syn. pro parte; Mass.; N.Y.; Wisc.).

Gargantua eremitus, Kirby, *Cat. Lep. Het.* i. p. 693. n. 1 (1892).

♂♀. Closely allied to *lugens* and *geminus*, but the first protarsal segment shorter, and the midtibia spiny. First protarsal segment about half the length of the tibia a little longer than the second segment, with two or three long spines, of which

the apical one is nearly as long as the segment itself; long terminal spur of hindtibia nearly two-thirds the length of the first tarsal segment. Spurs as a rule with one or more spines. Sexual armature resembling that of *geminus*. Paronychium with long lobes, one on each side.

♂. Tenth tergite more gradually narrowed than in *geminus*; sternite as in that species. Harpe rather deeply concave, intermediate in shape between those of *geminus* and *eremitoides*, with a simple dorso-distal tooth; no serration (though Smith, *l.c.*, describes the harpe as "dentate and serrate"). Penis-sheath (Pl. XXIX. f. 7) nearly the same as in *geminus*, the tooth not quite apical; the lobes projecting from the sheath heavily dentate, with the teeth almost arranged in a row.

♀. Vaginal plate closely resembling that of *geminus*, but as much wrinkled as in *justiciae*.

Larva peculiar, the third thoracic segment being raised anteriorly into a triangular protuberance, and the third and fourth bearing a velvety black dorsal patch.—Food: *Mentha*, *Salvia*, *Monarda*.

Pupa: tongue-case 10 mm. long, straight, slightly separated from the breast, end bulbous.

Hab. Canada to Georgia, westward to Missouri. (Clemens records it from Texas !).

In the Tring Museum 2 larvae and 1 pupa, and 16 ♂♂, 5 ♀♀ from: Massachusetts; Illinois; Virginia.

97. **Hyloicus eremitoides** (Pl. XII. f. 4, ♂).

Sphinx eremitoides Strecker, *Lep. Rhop. Het.* p. 93 (1874) (Kansas); Schaus, *Ent. News* vi. p. 143 (1895) (distinct).

Sphinx lugens, Grote (*nec* Walker, 1856), *Bull. Buffalo Soc. N. Sci.* i. p. 26 (1874) (Texas); id., *Canad. Ent.* vi. p. 199 (1874); id., *Bull. Buffalo Soc. N. Sci.* iii. p. 225. n. 65 (1877) (partim); Snow, *Trans. Kans. Ac. Sci.* iv. p. 28 (1875) (larva, pupa); Gaum., *Obs. Nat.* ii. (1875) (larva); Streck., *l.c.* p. 115. 142. t. 13. f. 12 (1877) (descr. of larva); Grote, *Papilio* ii. p. 76 (1882); Neum., *Ent. Amer.* i. p. 92 (1885); Grote, *Hawk Moths N. Am.* p. 45 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 191 (1888) (syn. partim); Edw., *Bull. U. St. N. Mus.* xxxv. p. 48 (1889).

Agrius lugens, Grote, *Bull. Buffalo Soc. N. Sci.* ii. p. 228. n. 65 (1875) (partim; "Arizona"; Texas).

Lintneria (?) *eremitoides*, Butler, *Trans. Zool. Soc. Lond.* ix. p. 621. n. 3 (1877) (Kansas).

As said by Schaus, *l.c.*, the present species has nothing to do with *lugens* of 1856, nor is it identical with the species described as *separatus* by Neumoegen. If one has *separatus* and *eremitoides* side by side—and does not compare them too superficially—the distinctness of the insects becomes at once evident. *H. eremitoides* is the paler and smaller of the two; it differs from the other chiefly in the following points: the black abdominal side-marks are smaller, more triangular, the prothoracic tegulae have no obviously yellow marginal spots, the mesial streak of the mesothoracic tegula is very much narrower, being not essentially heavier than the black dorsal border of the tegula, which border is distinct; the basal and medio-costal areas of the forewing are more white, the apical, oblique, interrupted black streak is much thinner, the subbasal white band of the hindwing is more grey, and the distal border of the hindwing narrower. The midtibia is as long (♀), or nearly as long (♂), as the first two tarsal segments together, while in *separatus* it equals in length the first tarsal segment (♂), or barely surpasses it (♀). The foretibia is more densely spinose (Pl. LXIV. f. 3) than in *separatus* (Pl. LXIV.

f. 4), there being present three or four rather heavy apical spines besides a number of smaller ones, situated on the outer surface from apex to near base.

♂. Tenth abdominal sternite more deeply sinuate than in *separatus*. Harpe similar to that of *lugens* (while the harpe of *separatus* resembles that of *geminus*), but narrower, ventrally less rounded-dilated, the tooth shorter and less curved (Pl. XXXVI. f. 17, dorsal view). Penis-sheath as in *geminus*, the apical process shorter than in *separatus*.

Larva (accord. to Strecker) pale green, with seven white side-bands; horn black.—Food: *Salvia*.

Two broods, larva in June and October.

Hab. Kansas; New Mexico; Texas; probably in all the Southern States.

In the Tring Museum 2 ♂♂ from: Kerrville, Texas; N. Mexico (Snow).

One pair lent to us by Mr. Schaus. Two ♂♂ in coll. Staudinger from: N. Mexico, near Hot Springs, Las Vegas, 7000 ft., July '82 (Snow).

Prof. Smith, *l.c.*, states that the species agrees with *eremitus* "in tibial and tarsal armature." This is incorrect, inasmuch as, in *eremitus*, the first protarsal segment is shorter, the spines are longer, and the midtibia is armed with spines.

98. **Hyloicus separatus** (Pl. XII. f. 3, ♂).

Sphinx andromedae Boisduval (*non* id., 1870), *Spec. Gén. Lép. Hét.* i. p. 89. n. 24 (1875) (partim); Schaus, *Ent. News* vi. p. 143 (1895) (syn. err.).

Sphinx separatus Neumoegen, *Ent. Amer.* i. p. 92 (1885) (New Mexico); Edw., *Ent. Amer.* iii. p. 223 (1888); Ottol., *Ent. News* vi. p. 218 (1895) (in coll. Neumoeg.).

Sphinx lugens, Smith (*non* Walker, 1856), *Trans. Amer. Ent. Soc.* xv. p. 191 (1888) (partim).

Sphinx separata, Kirby, *Cat. Lep. Het.* i. p. 691. n. 10 (1892) (N. Mexico).

♂♀. The "*lugens*" with which Neumoegen compares *separatus* in the description of the latter is *eremitoides*. The differences pointed out by him are just those which separate *eremitoides* from the present species, which is doubtless correctly identified, though we have not seen the type. Snow got both species in New Mexico.

It is very remarkable that *separatus* and *eremitoides* differ in the harpe exactly in the same way as do *lugens* and *geminus*.

In all the specimens we have seen the collar is conspicuously marked with a yellow marginal spot at each side; these spots are barely vestigial in the allied species; no mention has been made of them in the description of *separatus*. The antennae of the ♂ are very stout. Foretibia and first protarsal segment see Pl. LXIV. f. 4.

♂. Tenth abdominal sternite broader than in *geminus*, feebly sinuate. Harpe much shorter than in *geminus* but of nearly the same shape, more curved upwards, the dorsal edge sharply dentate (Pl. XXXVI. f. 16). The rounded apical process a little more prominent than in *geminus* and *eremitoides*, nearly as in *eremitus*, the tooth a little more proximal than in the former two species.

♀. Vaginal plate (Pl. XX. f. 14) almost as in *geminus*, but the sides of the distal part less elevated, the cone which bears the vaginal orifice more evenly rounded, more smooth, without lateral grooves.

Larva and pupa not known.

Hab. Colorado; New Mexico; Mexico; probably of wider distribution.

In the Tring Museum 15 ♂♂, 5 ♀♀ from: Las Vegas and Magdalena, New Mexico (Snow); San Juan Mts., Colorado, end of Aug. 1900 (Oslar).

In coll. Schaus and coll. Dognin from Jalapa, Vera Cruz. In coll. Staudinger from "Mexico." These Mexican specimens are a trifle darker than those from New Mexico.

99. Hyloicus istar sp. nov. (Pl. XII. f. 2, ♀).

Sphinx lugens Walker, *List Lep. Ins. B. M.* viii. p. 219. n. 11 (1856) (partim, teste Butler!).
Sphinx sordida var. A, Clemens, *Journ. Ac. N. Sci. Philad.* iv. p. 170. n. 65 (1859) (Jalapa).
Sphinx leucophaeata, Butler (*non* Clemens, 1859), *Trans. Zool. Soc. Lond.* ix. p. 618. n. 2 (1879) (Oaxaca); Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 23. n. 1 (1883) ("not seen"); Smith, *Ent. Amer.* iii. p. 153 (1887) (Mexico).
Sphinx andromedae, Schaus (*non* Boisduval, 1870), *Ent. News* vi. p. 143 (1895) (partim); Druce, *Ic. Suppl.* p 319. n. 3 (A) (1896) (partim).

♂ ♀. Larger than *separatus*, the black middle stripe of the mesothoracic tegula almost merged together with the black upper edge, the interspace between these lines being dark brown; pronotum without yellow spots.——Forewing washed with russet on the disc; no black longitudinal line in the apical half of the cell; black oblique antemedian band from base of M^1 to inner margin very prominent, consisting of two lines only, the third proximal line being vestigial between M^3 and SM^2 and not traceable beyond SM^2, while in *separatus* all three lines reach inner margin; five costal marks (costal parts of five lines, of which the three proximal ones are vestigial) between base and apex of cell, second and third mark much closer together than the first and second.——Distal border of hindwing narrower than in *separatus*, the black median band broad, nearly as wide at R^2 as the distal border; fringe with large brown spots.

Underside similar to that of *separatus*, rather darker, the forewing and body somewhat washed with russet; abdomen with a series of black middle spots, of which only the second is large. Body less stout than in *separatus*, armature of the legs similar, but the spines of the foretibia comparatively shorter. Antenna of ♂ not so stout, that of ♀ not so obviously clubbed.

♂. Tenth abdominal sternite narrow at the base and broad at the end as in *geminus*, minutely sinuate. Harpe intermediate between those of *geminus* and *separatus*, decidedly shorter than in the former, and longer than in the latter. Penis-sheath as in *separatus*.

♀. As in *praelongus* (Pl. XX. f. 15) with a lobe in front of the vaginal cavity, the lobe not distinctly sinuate.

Early stages unknown.

Hab. Mexico.

In the Tring Museum 3 ♂♂, 2 ♀♀ from "Mexico," one of them from Oaxaca, June (W. Schaus); *type*: Mexico, ♀.

Also in other collections, confounded with *lugens*, *geminus*, *separatus* and *eremitoides*.

100. Hyloicus praelongus sp. nov. (Pl. XII. f. 1, ♂).

♂ ♀. Closely resembling *istar*, with which it agrees in structure; decidedly more greyish white, the two black streaks of the mesothoracic tegula clearly separated by a grey interspace; forewing more elongate, coming in shape near that of *lanceolata*; markings as in *istar*, but the cell with a black apical streak, (SM^1) marked with a white dash outside the double antemedian line.

♀ Vaginal plate (Pl. XX. f. 15) hollowed out distally, the edges raised, mouth of vagina concealed in ventral view by a sinuate lobe with rounded angles.

Larva and chrysalis unknown.

Hab. Rosery Mine, Spanish Honduras, 3000 to 4000 ft. ; 3 ♂♂, 1 ♀ (Mus. Tring), *type* : ♂.

A ♀ from the same locality in coll. Dognin.

This may be only a southern form of *istar* ; but as the differences in colour are very apparent if the two insects are placed side by side, we think it wiser to keep them specifically distinct for the present. It is quite possible that the two occur together and are independent of each other, and differ also essentially in the earlier stages.

101. Hyloicus lanceolata.

(?) *Sphinx leucophaeata* Clemens, *Journ. Ac. N. Sci. Philad.* iv. p. 168. n. 63 (1859) (Texas) ; Schaus, *Ent. News* vi. p. 143 (1895) (probably *lanceolata*).

**Sphinx lanceolata* Boisduval, *Cons. Lép. Guat.* p. 73 (1870) (no descr. ; Guatemala) ; Feld., *Reise Novara, Lep.* t. 78. f. 3. (1874) (Mexico ;—Mus. Tring) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 109. n. 48 (1875) (Mexico) : Butl., *Trans. Zool. Soc. Lond.* ix. p. 619. n. 12 (1877) ; Streck., *Lep. Rhop. Het.* p. 142 (1878) (Panama) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 23. n. 4 (1883) ("not seen") ; Kirby, *Cat. Lep. Het.* i. p. 690. n. 1 (1892) ("Honduras" ; Mexico) ; Schaus, *l.c.* (1895) (common in Vera Cruz) ; Druce, *l c. Suppl.* p. 319 (1896) (Jalapa ; Orizaba).

Sphinx aequinoctialis Boisduval, *l.l.c.c.* (nom. max. supervacuum !).

♂♀. We quite agree with Mr. Schaus, who said, *l.c.*, that in his opinion *leucophaeata* was a northern form of *lanceolata*. The description of *leucophaeata* fits *lanceolata* except in one point ; the hindwing is said to be "greyish, with a black median band and broad black marginal band," no mention being made of the conspicuous black basal patch present in all specimens of *lanceolata*. As this patch is wanting in *chersis* or only vestigial, it seems to us quite likely that there exists, unknown to entomologists, a Sphinx in Texas and New Mexico which is the true *leucophaeata*, standing intermediate between *lanceolata* and *chersis*. There is certainly a link wanting between these two species, which agree in many respects. This link may differ from *lanceolata* in being devoid of the black basal patch of the hindwing, and from *chersis* in having (like *lanceolata*) a non-spinose midtibia. Another intermediate hypothetical form, which may turn out one day to be real, is a Sphinx with the basal patch present and the midtibia spinose.

So much is sure, that we cannot with any degree of certainty say whether *lanceolata* is a synonym of the unknown quantity named *leucophaeata*, or whether the two are distinct, or whether they are geographical forms of one species. The benefit of the doubt remains with *lanceolata*, which name we must employ for the present insect.

Boisduval did not describe the insect in 1870 ; he simply cited Felder's plate—of which he had received a copy in advance—and only remarks that the species was larger than the largest specimens of *tetrio* (= *asdrubal*). Whether the very bad *female* from Guatemala was really this species, or perhaps our *praelongus*, we cannot tell. All the specimens examined by us were from Mexico. Kirby gives Honduras as locality without authority ; but Strecker, *l.c.*, records it from Panama.

The species stands more isolated than its congeners, differing from the preceding *Hyloicus* in the *chersis*-like forewing and penis-sheath, from the following ones in the non-spinose midtibia. It represents a type from which *chersis* and allies have developed by acquiring spinose midtibiae. There is some rather obvious individual variation in the distinctness of the transverse lines of the forewing. The meso-thoracical tegulae have no black mesial line, but only a black upper border, as described by Clemens in *leucophaeata*. Butler's identification as *leucophaeata* of

what we have described above as *istar* was, therefore, certainly erroneous; his suggestion that *canadensis* might be *leucophaeata* was likewise wide of the mark.

♂. Tenth abdominal tergite similar to that of *Protoparee quinquemaculatus*, more cylindrical, less compressed; sternite elongate triangular, straight, obtuse, lateral margins very feebly turned upwards, very faintly notched. Clasper straight ventrally, strongly rounded apically, dorsally gradually and rather strongly dilated towards apex, the dorso-apical margin curved inwards, dorsal groove deep, bordered ventrally by a prominent fold, which bears long bristles; harpe strong, dorsal and ventral margins almost straight and parallel, apex sinuate, denticulate (Pl. XXXVIII. f. 4). Penis-sheath (Pl. XXIX. f. 9) produced into a long, gradually narrowing, pointed lobe, which is bent to a hook.

♀. Vaginal plate (Pl. XX. f. 16) not strongly chitinised, much folded proximally; a longitudinal mesial groove, narrowing proximally, where the edges of the folds which border the groove nearly touch each other above the vaginal orifice; within the wider distal part, behind the orifice, there is a rounded carina.

Early stages not known to us.

Hab. Mexico; Panama?

In the Tring Museum 7 ♂♂, 3 ♀♀ from Mexico: Orizaba, Huatuxco, and Teocelo, Vera Cruz.

102. Hyloicus chersis.

Lethia chersis Hübner, *Samml. Ex. Schm.* ii. t. 167 (1824?).
Sphinx cinerea Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 295. n. 6 (1839).
Sphinx chersis, Smith, *Trans. Amer. Ent. Soc. Lond.* xv. p. 184. t. 9. f. 6 (genit.) (1888) (Canada to Georgia, westw. to Calif.).

♂♀. No black mesial line on mesothoracic tegula; mesonotum always grey, no black-backed form known; black dashes on underside of abdomen comparatively larger in the large form than in the smaller ones. Spines at outer side of first segment of foretarsus and at the end of foretibia prolonged; paronychium reduced, without long lobe; first segment of hindtarsus as long as hindtibia; long apical spur of hindtibia half the length of the first tarsal segment; first segment of midtarsus with comb, but the bristles rather stout and not much prolonged.

♂. Tenth abdominal tergite elongate-triangular, sulcate above except at end, which is convex, acute, and curved downwards; underside concave; sternite with a broad and rather long lobe, which narrows somewhat to the end and is feebly sinuate. Clasper sole-shaped; harpe (Pl. XXXVIII. f. 5) divided by a broad distal sinus into a broad ventral lobe and a long horizontal process; the ventral lobe is concave, the upper and lower margins being bent inwards, especially the upper, which is irregularly and distinctly notched, while the distal and ventral edges are almost smooth as a rule; the slender process is cylindrical, tapering towards the pointed end, curving upwards a little, reaching the apical fourth of the clasper. Penis-sheath (Pl. XXIX. f. 11) produced into a long, narrowing, pointed, somewhat twisted and curved process.

♀. Vaginal plate (Pl. XX. f. 17) with a wide apical cavity of which the bottom is smooth, without a tubercle, the plate not divided mesially as in *perelegans*, *kalmiae*, and *lanceolata*, but the slit indicated by some longitudinal wrinkles.

Larva with dispersed granules, which are denser on the thorax; head distinctly narrowed above.—Food: *Syringa*, *Fraxinus*, *Ligustrum*.

Hab. Nearctic Region, from Canada to Mexico and California.

Four subspecies.

A very small specimen, said to be from Texas, represents perhaps a fifth geographical form. The subspecies are not different in the structure of the sexual organs of the ♂. The ♀ genital armature has only been examined of *chersis chersis*.

a. H. chersis mexicanus subsp. nov. (Pl. XIII. f. 5, ♂).

Sphinx perelegans, Druce (*non* Edwards, 1874), *Biol. Centr. Amer., Lep. Het. Suppl.* p. 319. n. 3 (B). t. 67. f. 3 (1896) (Durango).

♂. Darker than *oreodaphne* and *chersis*, but ground colour purer whitish grey, without clayish shade; the costal markings and the oblique subbasal postcellular double line of the forewing obviously more distinct, as is also the dark shade at the proximal side of the black submarginal line; white fringe-spots very sharply defined; black discal band of hindwing broad, strongly angled externally at SM^2; basal half of cell of forewing below brownish black. The figure in the *Biologia* is too brown.

♀. Not known.

Hab. Mexico.

In the Tring Museum 1 ♂ from "Mexico," *type*.

Mr. Druce was misled in the identification of this insect by Hy. Edwards, who determined the Durango specimen as *perelegans*.

b. H. chersis pallescens subsp. nov.

It is one of the objects of the systematist to elucidate facts, not to conceal them. The differences between the subspecies of *H. chersis* are slight, but they are there and must be registered.

♂♀. As large as the average *H. ch. chersis*; of the same white-grey ground colour as *mexicanus*, with which it agrees also in the sharply defined white fringe-spots. A perfect transition from *mexicanus* to *chersis*.

Hab. Arizona; Colorado.

In the Tring Museum 4 ♂♂, 2 ♀♀ from: Prescott, Arizona, 25. vi. '98 (Dr. Knuze), *type*: ♂; Huachuca Mts., Arizona, 18. vi. '99 (Dr. Kunze); Durango, Colorado, 10. vii. '99, 6500 ft. (Oslar); Ft. Collins, Colorado; Colorado, iv. '99.

c. H. chersis oreodaphne (Pl. XIII. f. 6, ♂).

Sphinx oreodaphne Edwards, *Proc. Cal. Ac. N. Sci.* v. p. 109 (1874) (Napa C°., June); Butl., *Trans. Zool. Soc. Lond.* ix. p. 618. n. 8 (1877) (distinct); Kirby, *Cat. Lep. Het.* i. p. 691. n. 3 (1892).

Sphinx chersis var. *oreodaphne* Edwards, *l.c.* vi. p. 93 (1875); Butl., *Papilio* i. p. 104 (1881) (distinct); Edw., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (Calif.).

Sphinx chersis, Strecker, *Lep. Rhop. Het.* p. 142 (1878) (*oreodaphne* is syn. of *chersis*); Holl. *Canad. Ent.* xviii. p. 102 (1886) (*oreodaphne* is syn.).

♂♀. Differs from *H. chersis chersis* in its inferior size, in the black discal band of the hindwing being narrower anteriorly, and in the comparatively smaller mesial dashes on the underside of the abdomen.

Hab. California; Oregon; probably farther north.

In the Tring Museum 3 ♂♂ from: California: Golden, Oregon, May (Biedermann).

We have received a photograph of the type of *oreodaphne* from Hy. Edwards's collection, through the kindness of Mr. Beutenmüller.

d. II. chersis chersis.

Lithe chersis Hübner, *l.c.*

Sphinx vinerea Harris, *l.c.* (1839) ; id., *Ins. Inj. Veg.* p. 328 (1842) ; Emm., *Nat. Hist. N. York* p. 219 (1854) : Walk., *List Lep. Ins. B.M.* viii. p. 217. n. 6 (1856) (U. St.) ; Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 169. n. 64 (1859) (Mass. ; Wisconsin) ; Morris, *Cat. Lep. N. Am.* p. 18 (1860) ; Clem., in Morris, *Synops.* p. 194. n. 2 (1862) (Mass. ; Wisc. ; S. States) ; Lintn., *Proc. Ent. Soc. Philad.* iii. p. 655 (1864) (descr. of *l.*, on *Oleaceae*) ; Scudd., *Psyche* ii. p. 76 (1877) (larva) ; Hag., *Papilio* iii. p. 62 (1883) (this name to be retained).

Sphinx chersis, Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 165. n. 92. & p. 190 (1865) (Atlantic district) ; Beth., *Canad. Ent.* i. p. 17. n. 22 (1868) (Canada) ; Harris, ed. Scudd., *Ent. Corr.* p. 282 (1869) (descr. of larva) ; Bowles, *Canad. Ent.* iii. p. 143 (1871) (Quebec, vi. vii.) ; Lintn., *Ent. Contr.* i. p. 192 & iii. p. 17 (1872) (N. York, vi., larva on lilac viii.) ; Thaxt., *Psyche* i. p. 30 (1874) (Newton, Mass., vii.) ; Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 26 (1874) (Canada ; Mass. ; N.Y. ; Penn.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 93. n. 30 (1875) ; Caulf., *Canad. Ent.* vii. p. 241. n. 13 (1875) (Montreal, common, vi.) ; Grote, *l.c.* ii. p. 228. n. 58 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 617. n. 1 (1877) ; Grote, *l.c.* iii. p. 224. n. 59 (1877) (Canada to Penn.) ; North., *Canad. Ent.* x. p. 16 (1878) (larva on black ash in viii. ix., Chicago) ; Mart., *Trans. Dept. Agr. Illin.* xviii. p. 105 (1880) (larva) ; Pil., *Papilio* ii. p. 66 (1882) (Dayton, O., one ♀) ; Reed, *Rept. Ent. Soc. Ont.* xii. p. 65 (1882) (larva) ; Edw., *Papilio* iii. p. 127 (1883) (larva, *Syringa*) ; Fish., *Canad. Ent.* xv. p. 238 (1883) (Buffalo, larva, pupa) ; Fern., *ibid.*, xvi. p. 21 (1884) (Orono, Me., very common) ; id., *Sphing. N. Engl.* p. 42. n. 16 (1886) (larva, pupa ; ash, lilac) ; Grote, *Hawk-Moths N. Am.* p. 44 (1886) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 47 (1889) (lit. rel. to metam.) ; Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y., electr. light) ; Kirby, *Cat. Lep. Het.* i. p. 690. n. 2 (1892) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 303. t. 5. f. 3 (1895) (N.Y., *l., p., i.* ; lilac, privet, ash) ; Hanh., *Canad. Ent.* xxix. p. 292 (1897) (Manitoba) ; Beutenm., *l.c.* x. p. 310 (1898) (N.Y.) ; Rowl., *Ent. News* x. p. 11 (1899) (Missouri, on ash).

♂ ♀. Wings and body with a distinct clayish tinge. Fringe of forewing nearly all brown, the white scales so covered by brown ones that only their tips are visible.

Hab. Atlantic Subregion : Canada to Georgia, westward to the Mississippi basin.

In the Tring Museum 3 larvae, 1 pupa, 10 ♂♂, 8 ♀♀ from : Canada ; N. Jersey : N. York ; Virginia ; South Dakota.

The three individuals from the last place are scarcely different from *orcodaphne*. An apparently bred specimen from Texas (received from Messrs. Standinger and Bang-Haas) is the smallest *chersis* we have seen, its forewing measuring only 34 mm. in length ; it may represent a Texan subspecies, but it is more likely that the larva was underfed, and that the specimen is therefore an artificially dwarfed individual.

103. Hyloicus vancouverensis (Pl. XIII. f. 3. 4, ♂♂).

Sphinx vancouverensis Edwards, *Proc. Calif. Ac. N. Sci.* v. p. 111 (1874) (Vancouver I., viii.) : Grote, *Bull. Buffalo Soc. N. Sci.* ii. p. 228. n. 61 (1875) ; id., *l.c.* iii. p. 224. n. 62 (1877) (Calif.) ; Edw., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (Big Tree, Calif. ; Oregon) ; Trum., *Ent. News* viii. p. 27 (1897) (S. Dakota).

Sphinx drupiferarum, Holland, *Canad. Ent.* xviii. p. 103 (1886) (vanc.=*drupif.* ex err.) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 177 (1888).

Sphinx vashti Strecker, *Lep.* p. 136. t. 15. f. 4 (1878) (Arizona) ; Dyar, *Psyche* vii. p. 177 (1894) (Montana ; egg, larval stages, pupa ; on *Symph. rac.*).

Sphinx albescens Tepper, *Bull. Brooklyn Ent. Soc.* iv. p. 1. t. 1. f. 3 (1881) (Colorado).

♂ ♀. Mesothoracic tegula with heavy black edge, no mesial line, middle of mesothorax either grey or black. Basi-costal area of forewing whitish grey, sparely limited behind by a brownish black area ; fringe with a few grey scales beneath between the veins. White discal band of hindwing very clearly marked on the underside, black discal band not obviously dentate. Some of the spines of

foretibia and -tarsus prolonged ; first segment of midtarsus with comb, but only the most proximal bristles long ; first segment of hindtarsus only as long as the four other segments together ; long apical spur of hindtibia half the length of the first tarsal segment. Paronychium reduced, *with* short lobe.

♂. Tenth abdominal tergite elongate, sharply pointed, convex above (Pl. XXVIII. f. 10, dorsal view), abruptly curved downward, forming a long hook (Pl. XXVIII. f. 9, side-view) ; sternite with a very broad lobe (Pl. XXVIII. f. 10), which is very feebly sinuate. Clasper comparatively shorter and more rounded, especially dorsally, than in *chersis*; harpe somewhat similar to that of *chersis*, but the ventral lobe very short, and the long process more oblique and somewhat undulate (Pl. XXXVIII. f. 8). Penis-sheath (Pl. XXIX. f. 4) with a rather short, blunt process which is concave on the inner side.

♀. Vaginal plate represented by Pl. XX. f. 19 in a ventral view, by f. 20 in a side-view ; a large subapical cavity, in which the vaginal orifice is situated, partly covered in front by a convex lobe.

Larva green ; side-bands white with narrow black anterior border ; horn smooth, black above and below.—Food : *Symphoricarpus racemosus.*

Pupa : tongue-case free, rounded, 8 mm. long.

Two broods.

There occur, in the same places, two forms differing in the colour of the thorax. These forms are said to be seasonal (Smith, *l.c.*, p. 234). The dated material in the Tring Museum and other collections confirms on the whole Mr. Bruce's positive statement, referred to by Smith, *l.c.*, that of the two broods one is always *albescens* (with the black thorax) and the other *vancouverensis* (with the grey thorax). However, some of the specimens of the early brood, or rather of an early date, are as black on the thorax as some of the later individuals, and others are intermediate. This seeming irregularity may be due to the phenomenon known of other *Sphingidae* that pupae often lie over from one brood to the other, or longer. The black notum is doubtless the younger character, and both broods of the species may be on the way towards developing into a black-backed insect.

Further researches in this respect are necessary, and we hope that the keen entomologists on the other side of the Atlantic will not be slow in making further careful observations. We here can do no more than merely state that the two forms are connected by intergradations and are identical in structure.

a'. H. vancouverensis f. *vancouverensis* (Pl. XIII. f. 3, ♂.)

Sphinx vancouverensis Edwards, *l.c.* (Vancouver, August) ; Smith, *l.c.* p. 234 (1888).
Sphinx rushti Strecker, *l.c.* (1878) (Arizona).

♂ ♀. Thorax grey.—The spring form from hibernated pupae ?

b'. H. vancouverensis f. *albescens* (Pl. XIII. f. 4, ♂).

Sphinx albescens Tepper, *l.c.* (1881) (Colorado) ; Hanh., *Canad. Ent.* xxix. p. 292 (1897) (Manitoba, vii.) ; id., *l.c.* xxxi. p. 52 (1899) (Manitoba) ; Heath, *Canad. Ent.* xxxii. p. 94 (1900) (Manitoba, vi.).

♂ ♀. Thorax black.—The summer form ?

Hab. Pacific Subregion : from California and British Columbia, westward to the east side of the Rocky Mountains.

In the Tring Museum: f. *vancouverensis*, 23 ♂♂, 6 ♀♀, some of them transitions, from: Quincy, Calif., 5. vi. '97 (Watson); S. Utah, June; Miles City, Montana; Glenwood Springs, Colorado, June, 5700 ft. (Oslar); S. Colorado, May and June; Farmington, New Mexico, June.

f. *albescens*, 17 ♂♂ from: California; Durango, Colorado, 6500 ft., July (Oslar); Grand Junction, Colorado, July (Oslar); Fort Collins, Colorado, August; Farmington, N. Mexico, June.

104. **Hyloicus libocedrus** (Pl. XIII. f. 7, ♂).

Sphinx libocedrus Edwards, *Papilio* i. p. 115 (1881) (Prescott, Arizona).

♂. Resembling *chersis*, but even smaller than *vancouverensis*; mesothoracic tegula with a thin brown mesial line; white or yellowish side-patches of abdomen bordered all round with black. Legs as in *chersis*. Inner angle of forewing less rounded than in any of the allied species.

♂. Tenth abdominal segment nearly as in *vancouverensis*; the tergite shorter, and the sternite much more deeply sinuate. Harpe (Pl. XXXVIII. f. 10) essentially as in *vancouverensis*, but the long process curved downward and recurved at end. Penis-sheath (Pl. XXVIII. f. 52) obliquely truncate, without the elongate slender process of the allied species.

♀. Not seen.

Early stages unknown.

Hab. Arizona and Texas, most likely more widely distributed in the Southern States and Northern Mexico.

a. H. libocedrus libocedrus (Pl. XIII. f. 7, ♂).

Sphinx libocedrus Edwards, *l.c.*; Smith, *Trans. Amer. Ent. Soc.* xv. p. 183 (1888); Edw., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (Prescott, Arizona); Kirby, *Cat. Lep. Het.* i. p. 691. n. 4. (1892) (Arizona).

♂. Side-spots of abdomen white.

Hab. Arizona, near Prescott.

In the Tring Museum 11♂♂ from Arizona.

b. H. libocedrus insolita.

Sphinx insolita Lintner, *Papilio* iv. p. 145 (1884) (Rio Grande, Texas, 1 ♂); Edw., *Ent. Amer.* iii. p. 223 (1888); Smith, *l.c.* p. 186 (1888); Kirby, *Cat. Lep. Het.* i. p. 691. n. 5 (1892).
Sphinx libocedrus, Smith, *l.c.* p. 184 (1888) (partim, ♀; Belfrage coll.).

♂♀. Side-spots of the abdomen yellowish in both sexes. The long process of the harpe a little more curved than in *lib. libocedrus*.

Hab. Texas.

In the Tring Museum 1 ♂ without locality. In the Berlin Museum 1 ♂ from Texas.

105. **Hyloicus perelegans** (Pl. XIII. f. 1. 2, ♂♂).

Sphinx perelegans Edwards, *Proc. Calif. Ac. N. Sci.* v. p. 109 (1874) (Gilroy, St. Clara, Calif.).
Lintneria? perelegans, Butler, *Trans. Zool. Soc. Lond.* ix. p. 621. n. 2 (1877) (Gilroy, St. Clara, Calif.).

♂♀. Anterior tibia and tarsus with heavy spines; long apical spur of hind-tibia not half the length of the first tarsal segment; this much longer than the

other segments together ; comb of midtarsus indicated by a few long bristles : paronychium with or without long lobe (seasonal difference?). Mesonotum and occiput grey or black, with intergradations, upper half of mesothoracic tegula also grey or black, with a rather indistinct blackish middle line. Forewing : a black line upon R^1, entering cell ; the white band at the distal side of the weak black submarginal line much broader than in *chersis*.

♂. Tenth abdominal tergite gradually narrower to end, which is abruptly pointed, gradually curved, subcylindrical, being convex above and somewhat less so below ; sternite short, broad, not sinuate mesially, the sides turned upwards (Pl. XXVIII. f. 12, side-view ; f. 13, dorsal view). Clasper as in *chersis* ; harpe (Pl. XXXVIII. f. 6) very different from that of all the other *Hyloicus*, consisting of a long, flat, tapering plate which terminates in a point ; its dorsal edge is continuous with the subdorsal fold of the clasper, which fold bears very long bristles ; its ventral edge is more or less irregularly sinuate and bears here and there a small sharp tooth. Penis-sheath (Pl. XXIX. f. 5) not unlike that of *vancouverensis*, but the process longer, its apex slightly incrassate, rounded, almost knob-like.

♀. Vaginal plate (Pl. XX. f. 18) with a very large cavity, into which opens the vagina, the cavity extending to near the base of the plate ; its roof is more or less contracted in dry specimens, especially proximally, so that the opening is not of the same size or of the same shape in different individuals ; the figure is taken from a specimen in which the edges of the roof of the cavity approach each other, the plate bearing in this case an obvious resemblance to that of *lanceolata* ; the plate differs from that of *chersis* not only in the much larger size of the cavity, and the much more proximal position of the mouth of the vagina, but also in the presence of a broad, ovate or elongate, mesial tubercle, homologous to the longer and narrower mesial rounded keel of *lanceolata*.

Larva and chrysalis not described.

We unite here under *perelegans* two forms, one with grey, the other with black mesonotum, the forms corresponding to those of *H. vancouverensis*, but differing from one another not only in the colour of the thorax and wings, but also in the structure of the claw-segment of the tarsi. The form with grey thorax is generally considered identical with *chersis chersis*, or *chersis oreodaphne*, from which it is, however, specifically distinct. Both forms of *perelegans* agree in the sexual armature and in some essential characters of the wings, and from this we conclude that the peculiar divergency in the development of the claw-segments does not indicate specific distinctness of the two, though we were very much surprised when we discovered that we had here a case of apparently quite constant structural dimorphism. The differences may be seasonal, but the dates of our specimens, as in the case of *vancouverensis*, do not absolutely point to this ; breeding alone will clear up the question.

a'. H. perelegans f. *asellus* nov. (Pl. XIII. f. 2, ♂).

In collections confounded with *H. chersis oreodaphne*.—*Type :* Colorado.

♂♀. Occiput and mesonotum grey ; ground colour of forewing also almost uniformly grey, white submarginal band broad ; fringe with distinct white spots. Paronychium reduced (Pl. LXIV. f. 14. 15), *without* lobe.

b'. H. perelegans f. *perelegans* (Pl. XIII. f. 1, ♂).

Sphinx perelegans Edwards, *l.c.* (1874); Grote, *Bull. Buffalo Soc. N. Sci.* ii. p. 228. n. 59 (1875); id., *l.c.* iii. p. 224. n. 60 (1877); Butl., *Papilio* i. p. 105 (1881); Riv., *ibid.* iii. p. 65 (1883) (Berkeley, Calif., at flowers vi.); Smith, *Trans. Amer. Ent. Soc.* xv. p. 179 (1888) (Calif.); Edw., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (Sta. Clara, Calif.).

♂♀. Mesonotum and upper half or third of mesothoracic tegula black, forewing much shaded with black, an ill-defined basi-discal area whitish; white submarginal band broad, black line at its proximal side indistinct. Paronychium with prolonged lobe.

A photograph of the type received from Mr. Beutenmüller agrees with this form.

Hab. Pacific Subregion of Nearctic Region, from California and British Columbia eastward to the east side of the Rocky Mountains.

In the Tring Museum: f. *asellus*, 6 ♂♂, 3 ♀♀ from: Cornwallis, Oregon, July; Pullman, Washington, May; Huachuca, Arizona, 18. June (Dr. Kunze); Garfield Co., Colorado; Glenwood Springs, Colorado (Oslar); Grand Junction, Colorado, July (Oslar); Durango, Colorado, July (Oslar, *type*).

f. *perelegans*, 8 ♂♂, 3 ♀♀ from: Mendocina, Calif.; Alma, Sta. Clara, Calif.; Los Angeles, Calif., May; Quincy, Calif., June (Watson).

106. **Hyloicus canadensis.**

**Sphinx canadensis* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 93. n. 29 (1875) (Quebec; — coll. Charles Oberthür); Butl., *Trans. Zool. Soc. Lond.* ix. p. 629 (1877) (= ? *leucophaeata* !); Grote, *Bull. Buffalo Soc. N. Sci.* iii. p. 225. n. 66 (1877) (Canada; = ? *plota*); Fern., *Sphing. N. Engl.* p. 43. n. 17 (1886) (Bangor, Maine, B. vii.; mentions larva Newfoundland); Grote, *Hawk-Moths N. Am.* p. 44 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 190 (1888) (Newfoundld., Can., Maine, Ohio, N.Y.); Kirby, *Cat. Lep. Het.* i. p. 691. n. 14 (1892) (Canada, Montana); Moff., *Canad. Ent.* xxvii. p. 280 (1895) (Ontario); Harv. & Knight, *Psyche* viii. p. 78 (1897) (larva mention., this spec. ?).

Sphinx plota Strecker, *Lep. Rhop. Het.* p. 106 (1875) (Montreal); id., *l.c.* p. 115. t. 13. f. 13 (♂) (1876) (Cincinnati); id., *l.c.* p. 142 (1877) (= ? *canadensis*); Caulf., *Canad. Ent.* vii. p. 241. n. 17 (1875) (Montreal, rare); Pil., *Papilio* ii. p. 66 (1882) (Dayton, O., = *canadensis*, 2 specim.).

♂. Apical spine of segments of foretarsus and two or three spines at the end of the foretibia prolonged, but they are not so stout as in *chersis* and *vancouverensis*; first segment of hindtarsus much longer than the four other segments together; comb of midtarsus with very few moderately prolonged bristles; spurs of midtibia often with one or two spines. Abdomen with strongly marked mesial line on the tergites as well as on the proximal sternites; the lateral line of the sternites also distinct. Paronychium reduced, very short, without distinct lobes.

♂. Tenth abdominal tergite elongate-triangular, convex above, proximally concave below, gently curved, extreme apex forming a short, bluntly pointed hook; sternite with a long mesial lobe, which is slightly spatulate, with the end rounded and sinuate. Clasper (Pl. XL. f. 5) somewhat less sole-shaped than in *chersis*, more narrowed distally; harpe with a broad ventral lobe, which is concave; from the dorso-distal surface of this lobe originates a slender cylindrical process narrowing to end, not sharply pointed, homologous to the long process of the harpe of *H. chersis*, *vancouverensis*, etc. The penis-sheath differs essentially in being at the end widened laterad into a sharply pointed, triangular flap (Pl. XXIX. f. 6); the apex is produced into a heavy, short, curved, tooth-like process.

♀. Not seen.

Early stages not described.

Hab. Canada: Newfoundland; New England; Ohio.

In the Tring Museum 6 ♂♂ from: Massachusetts; New Hampshire.

107. Hyloicus francki.

Sphinx francki Neumoegen, *Ent. News* iv. p. 133 (1893) (Kansas City).

Said to be intermediate between *chersis* and *kalmiae*. Mr. Franck, the discoverer of the insect, suggests in a letter to us that it is a hybrid between the two. The examination of the structure (antenna, legs, genital armature) will show whether *francki* is a distinct species or a hybrid.

Hab. Kansas City.

Not seen.

108. Hyloicus kalmiae.

Sphinx kalmiae Abbot & Smith, *Lep. Georgia* i. p. 73. t. 37 (*l. p. i.*) (1797) (on *Kalmia*); Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 295. n. 4 (1839); Gosse, *Canad. Nat.* p. 260 (1840) (egg, larva); Walk., *List Lep. Ins. B. M.* viii. p. 218. n. 8 (1856) (Orilla, W. Can.; N.Y.); Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 171. n. 67 (1859) (larva, pupa; lilac, vii.; Canada, N.Y., Penn., Mass., Georg.); Morris, *Cat. Lep. N. Am.* p. 18 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 196. n. 5 (1862); Harris, ed. Flint, *Ins. Inj. Veg.* p. 328 (1863); Lintn., *Proc. Ent. Soc. Philad.* iii. p. 657 (1864) (descr. of *l.*, on *Syringa*); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 165. n. 94 (1865) (Atlantic district); Bowles, *Canad. Ent.* iii. p. 143 (1871) (Quebec, vi. vii.); Lintn., *Ent. Contr.* i. p. 192 & iii. p. 179 (1872) (N.Y., vii., larva ix.); Grote, *Bull. Buffalo N. H. Soc.* i. p. 25 (1874); Thaxt., *Psyche* i. p. 30 (1874) (Newton, Mass., vii.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 91. n. 27 (1875); Canlf., *Canad. Ent.* vii. p. 241. n. 15 (1875) (Montreal, common vi. vii.); Grote, *l.c.* ii. p. 238. n. 57 (1875); Mann, *Psyche* ii. p. 75 (1877); Butl., *Trans. Zool. Soc. Lond.* ix. p. 620. n. 14 (1877); Grote, *Canad. Ent.* ix. p. 120 (1877) (L. Erie at sugar, vi. 7th); Dev., *ibid.* p. 160 (1877); Grote, *Bull. Buffalo Soc. N. Sci.* iii. p. 224. n. 58 (1877) (Canada to Southern St.); Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 104 (1880) (larva); Reed, *Rept. Ent. Soc. Ont.* xii. p. 68 (1882) (larva); Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Me.); id., *Sphing. N. Engl.* p. 41. n. 15 (1886) (descr. of *l.*, *p.*, *i.*; on ash, lilac, *Kalmia*); Grote, *Hawk Moths N. Am.* p. 44 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 177 (1888) (Can. to Georgia, Ala., westw. to Missouri, Illin., Wisc., prob. farther west and south); Edw., *Bull. U. St. N. Mus.* xxxv. p. 47 (1889) (lit. rel. to metam.); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y., electr. light); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 301. t. 5. f. 2 (1895) (N.Y., not comm., *l.*, *p.*; on laurel, lilac, privet, *Chionanthus*, ash); Goss, *Ent. News* vii. p. 297 (1896) (N. Hampsh., common); Beutenm., *l.c.* viii. p. 293 (1896) (metam., on *Syringa*); Fyles, *Rept. Ent. Soc. Ont.* xxx. p. 104 (1900) (Quebec, on Populus trem.).

Lethia kalmiae, Hübner, *Verz. bek. Schm.* p. 141. n. 1511 (1822).

♂♀. Antenna slender in both sexes, not club-shaped; ciliae of ♀ rather long, the basal and subdorsal ones of each segment almost forming a distinct comb. Palpus prominent. Spines of foreleg slender, none much prolonged; first segment of foretarsus as long as that of midtarsus, one-third longer than that of hindtarsus, more than half as long again as the other segments together; spurs rather long, long apical one of hindtibia more than half the length of the first tarsal segment; comb of midtarsus with some moderately long bristles; paronychium with long pointed lobe.

♂. Tenth abdominal tergite elongate, remaining narrow to end, slightly curved, apex obtuse, somewhat flattened above; sternite produced into a short, very broad, irregularly rounded, almost vertical, mesial lobe, which is minutely sinuate in middle. Clasper with almost straight dorsal margin, little narrowed distad, apex regularly rounded; harpe (Pl. XXXIX. f. 11) with three processes, a ventral one

finger-like, a little curved at end, and two dorso-distal ones, separated by a rounded sinus, both pointed, tooth-like, the upper more or less denticulated ; subdorsal fold of clasper broad above the harpe, short, not extending beyond basal third of clasper, clothed with long bristles. Penis-sheath (Pl. XXIX. f. 12) with a very long, slender, apical process, which is concave on the inner side, and is armed at the outer side just before the rounded end with a minute tooth, reminding one of the same structure of *lugens* and allies.

♀. Vaginal plate (Pl. XXI. f. 2) not unlike that of *H. lanceolata* in many respects ; the mouth of the vagina in the middle of the plate, which is triangularly produced proximally, longitudinally folded and grooved mesially ; behind the mouth of the vagina there is an elongate, somewhat ovate, smooth tubercle.

Larva with sharply-marked black oblique side-bands, horn and anal segment with black granules, thorax not granulose.—Food-plants : *Syringa*, *Ligustrum*, *Chionanthus*, etc.

Pupa glossy, not strongly sculptured ; tongue-case reaching to end of foreleg, free, touching breast only with swollen end.

Hab. Atlantic subregion, from Canada to Georgia, westwards to the Mississippi basin.

In the Tring Museum 2 larvae, 1 pupa, and 12 ♂♂, 6 ♀♀ from : Canada : N. Jersey.

109. Hyloicus gordius.

Sphinx gordius Cramer, *Pap. Ex.* iii. p. 91. t. 247. f. B (1779) (Virginia).

♂♀. Similar in structure to *H. luscitiosa*, the lobes of the paronychium much longer ; hindtibia more spiny in ♀ than in ♂.

♂. Tenth abdominal tergite (Pl. XXVIII. f. 15) strongly compressed, highest before end, hooked, pointed, upper surface reduced distally to a line ; sternite (Pl. XXVIII. f. 14) triangular, obtusely pointed. Clasper as in *luscitiosa* and *drupiferarum*, more rounded dorsally, apex less broad ; harpe (Pl. XXXIX. f. 9) with a short, broad, concave, rounded, unarmed ventral process, and a much longer, narrower, irregularly dentate subdorsal one, the latter curving ventrad ; subdorsal fold of clasper broad, short. Penis-funnel (Pl. XXVIII. f. 42, P-F) rather more pointed than in *luscitiosa* ; penis-sheath (Pl. XXVIII. f. 42) ending in a straight, solid, sharply pointed, conical process.

♀. Vaginal plate (Pl. XXI. f. 3) convex mesially, impressed laterally, the proximal edge sharply marked, mouth of vagina subterminal, situated in a cavity which extends to the distal edge of the plate.

Larva bright green ; head with a yellow and a brown side-stripe ; seven oblique side-bands, white, margined with red in front ; horn black, green above and beneath.

On apple, ash and *Myrica*.

Pupa with a very short free tongue-case, closely applied to the breast.

Two broods.

Hab. Atlantic subregion, from Canada to Georgia, westward to the Mississippi basin and Colorado.

Two subspecies :

a. H. gordius oslari subsp. nov.

♂♀. Larger than the Atlantic form, paler, especially the forewing, which is less shaded with black on disc ; discal band of underside of hindwing less sharply marked ; black mesial spots of underside of abdomen very small.

Hab. Colorado.

In the Tring Museum 3 ♂♂, 2 ♀♀ from Glenwood Springs, Colorado, June 1901 (Oslar).

b. H. gordius gordius.

Sphinx gordius Cramer, *l.c.*; Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 295. n. 5 (1839) (larva, pupa); Walk., *List Lep. Ins. B. M.* viii. p. 218. n. 9 (1856); Fitch, *Rept. Ins. N.Y.* iii. p. 341 (1856) (larva); Clem., *Journ. Ac. Nat. Sci. Philad.* iv. p. 173. n. 70 (1859) (Maine; Mass.; Connect.); Morris, *Cat. Lep. N. Am.* p. 19 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 198. n. 8 (1862); Harris, ed. Flint, *Ins. Inj. Veg.* p. 328 (1862) (on apple); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 165. n. 95 (1865) (Atlantic district); Bowles, *Canad. Ent.* iii. p. 143 (1871) (Quebec, vi.); Lintn., *Ent. Contr.* i. p. 192 & iii. p. 179 (1872) (N.Y., E. v. vi.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 91. n. 26 (1875); Pack., *Half-hours with Ins.* p. 180 (1877) (larva); Butl., *Trans. Zool. Soc. Lond.* ix. p. 618. n. 6 (1877): Grote, *l.c.* iii. p. 224. n. 63 (1877); Worth., *Canad. Ent.* x. 16 (1878) (Chicago, larva on black ash in viii. ix.); Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 105 (1880) (larva); Saund., *Ins. Inj. Fruit* p. 86. n. 32. f. 85 (*i.*) (1883) (larva, pupa); Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Me.); id., *Sphing. N. Engl.* p. 44. n. 18. t. 1. f. 1 (*i.*) (1886) (*larva, pupa*; on apple, asb, *Myrica*); Grote, *Hawk-Moths N. Am.* p. 45 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 180. t. 10. f. 1 (genit.) (1888) (Canada to Georgia, westw. to the Missi-sippi); Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 48 (1889) (lit. rel. to metam.); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y., electric light); Beuteum., *Bull. Amer. Mus. N. H.* vii. p. 302. t. 5. f. 4 (1895) (N.Y.; descr. of larva, pupa, imago); Trum., *Ent. News* viii. p. 27 (1897) (S. Dakota); Soule, *Psyche* viii. p. 158 (1897) (larva on *Andromeda*; unusual food); Rowl., *Ent. News* x. p. 11 (1899) (Missouri; on apple).

Lethia gordius, Hübner, *Verz. bek. Schm.* p. 141. n. 1512 (1822); Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 26 (1874) (Canada; N.Y.; Penn.); Thaxt., *Psyche* i. p. 30 (1874) (Newton, Mass., vii.); Grote, *l.c.* ii. p. 228 n. 62 (1875).

* *Sphinx poecila* Stephens, *Illustr. Brit. Ins., Haust.* i. p. 123 (1828) (Mus. Brit.); Wood, *Ind. Ent.* p. 246. t. 53. f. 26b (1839).

Sphinx eremitus, Grote, *l.l.c.c.* (1875-77) (sub syn. as *poecila*!).

Gargantua gordius, Kirby, *Cat. Lep. Het.* i. p. 692. n. 3 (1892).

♂♀. Mesial spots of underside of abdomen distinct, elongate. Forewing more or less shaded with blackish brown; discal band of hindwing generally very distinct above and below.

Hab. Atlantic subregion, from Canada to Georgia, westward to the Mississippi basin.

In the Tring Museum 1 larva, and 12 ♂♂, 6 ♀♀ from: Canada; N. Jersey; Virginia.

110. Hyloicus luscitiosa.

Sphinx luscitiosa Clemens, *Journ. Ac. N. Sci. Philad.* iv. p. 172. n. 69 (1859) (Wisconsin; N.Y.); Morris, *Cat. Lep. N. Am.* p. 19 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 197. n. 7 (1862): Grote & Rob., *Proc. Ent. Soc. Phil.* v. p. 165. n. 96 (1865) (Atlantic district); Walk., *List Lep. Ins. B.M.* xxxi. p. 36 (1866); Caulf., *Canad. Ent.* vii. p. 241. n. 16 (1875) (Montreal, very rare); Streck., *Lep. Rhop. Het.* p. 114. t. 13. f. 11 (♀) (1876) (Canada; N. Engl.; Middle St.; Ohio; Maryld.; Virg.; Ind.; Wisc.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 618. n. 7 (1877); Grote, *Bull. Buffalo Soc. N. Sci.* iii. p. 225. n. 64 (1877); Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Me., rare); id., *Sphing. N. Engl.* p. 45. n. 19 (1886) (N.J.; willow); Grote, *Hawk-Moths N. Am.* p. 44 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 181. t. 9. f. 5 (genit.) (1888) (*l.* on willow); Soule, *Psyche* v. p. 85 (1888) (descr. of larva and pupa; poplar); Dyar, *Ent. Amer.* v. p. 189 (1889) (larva); Kunze, *Ent. News* v. p. 265 (1894) (larva on *Salix*, *Betula*); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 302. t. 5. f. 3 (1895) (N.Y., very rare; larva, pupa; willow); id., *l.c.* viii. p. 292 (1896) (metam., on *Salix*); Brehm, *Ent. News* viii. p. 20 (1897) (Newark, egg May 19th); Moff., *Canad. Ent.* xxix. p. 224 (1897) (London, Canada, vi.); Hanh., *ibid.* xxix. p. 292 (1897) (Manitoba); Johnst., *ibid.* xxx. p. 71 (1898) (Hamilton, Ont., v. 28th); Hanh., *ibid.* xxxi. p. 52 (1899) (Manitoba); Bolst. & Small., *Ent. News* xi. p. 580 (1900) (Mass.); Fyles, *Rept. Ent. Soc. Ont.* xxx. p. 104 (1900) (Quebec, on Populus trem., descr. of *l.*).

Lethia luscitiosa, Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 26 (1874); Thaxt., *Psyche* i. p. 30 (1874) (Newton, Mass., vii.); Grote, *l.c.* ii. p. 228. n. 63 (1875) (Mass.; N.Y.; Wisc.).
Lethia (!) *luscitiosa*, Strecker, *l.c.* (sub syn.).
Gargantua luscitiosa, Kirby, *Cat. Lep. Het.* i. p. 181 (1892).

♂ ♀. Antenna much shorter in ♀ than in ♂, being in the latter about two-fifths, in the former two-sevenths, the length of the forewing. Palpus roughly scaled as in *drupiferarum*, prominent. Spines of foreleg not prolonged, first segment of foretarsus nearly as long as segments 2 to 4 together; spurs of mid- and hindtibiae with a few spines; hindtibia mostly obviously spinose apically; long apical spur of hindtibia about half the length of the first tarsal segment, or less; this segment as long as the other four together; paronychium reduced, with a short slender lobe; midtarsus without distinct comb of long bristles; third row of tarsal spines rather less pointing distad than the spines of the other rows, especially in ♂.

♂. Tenth abdominal tergite similar to that of *gordius*, very strongly compressed, pointed, hooked, shorter than in *gordius*; the sternite nearly as in that species, the lobe rather shorter, more rounded at end. Clasper as in *drupiferarum*, dorsal margin almost straight in middle; harpe (Pl. XXXIX. f. 10) divided into two lobes by a rounded apical sinus, the lobes of nearly equal length and width, both slightly curved towards each other and somewhat concave, the lower one rounded at end, without dentition, the upper pointed and dentate at dorsal margin. Penis-funnel (Pl. XXVIII. f. 43. p-f) obtusely rounded, convex beneath, not prismatical; penis-sheath (Pl. XXVIII. f. 43) somewhat twisted apically, ending in a sharp conical process.

♀. Vaginal plate somewhat resembling that of *H. chersis* and *gordius*; mouth of vagina subterminal, the anterior margin of the cavity somewhat sinuate in the middle.

Larva with minute black ring-dots situated upon the annulets; horn with black lateral line, tip black, head and horn rugose; side-bands white, bordered in front with pinkish lilac.—Food-plants: *Salix*; *Populus*; *Betula*.

Pupa with a short (3 mm.) tongue-case, which is free, but lies closely against the breast.

Hab. Canada to Virginia, westward to the Mississippi basin and Colorado.

In the Tring Museum 4 larvae, 2 pupae, and 2 ♂♂ 13 ♀♀ from: N. Jersey; Denver, Colorado (Oslar).

111. Hyloicus drupiferarum.

Sphinx drupiferarum Abbot & Smith, *Lep. Georgia* i. p. 71. t. 36 (*l.*, *i.*) (1797) (on *Celtis* & plum); Smith, *Trans. Amer. Ent. Soc.* xv. p. 177. t. 9. f. 3. 4 (genit.) (1888) (syn. pro parte; Canada to Georgia, westw. to Calif., Vancouver I., Oregon, Colorado, Utah).
Lethia drupiferarum, Hübner, *Verz. bek. Schm.* p. 141. n. 1510 (1822).

♂ ♀. Antenna short, only one-third (♂) or less (♀) the length of the forewing. Palpus much produced beyond the scaling of the frons. Spines of foreleg numerous but not long; first segment of foretarsus incrassate, about as long as segments 2 and 3 together; first midtarsal segment longer than the other segments together, comb with some long bristles, spines of rows 2 and 3 rather close together and long; long apical spur of hindtibia more than half the length of first tarsal segment, which is longer than segments 2 to 5 together, the metatibial spurs often with one or two spines; paronychium with lobes, which, however, do not reach far beyond the middle of the claw. There are two or three black lines in the cell of the

forewing corresponding to the bases of the branches of the radial trachea in the chrysalis. The black ventro-lateral lines of the abdomen are very distinct.

♂. Tenth abdominal tergite rather strongly curved, sides of process nearly parallel, apex rather abruptly narrowed to an obtusely pointed hook, upper surface rather flattened, underside convex; sternite with a broad, distally somewhat narrowed, gently curved, apically sinuate and rounded mesial lobe. Clasper broadly sole-shaped, rather narrow at end, dorsal margin more rounded than ventral one; harpe (Pl. XXXVIII. f. 19) produced ventro-distally into a finger-like process, which is slightly curved; the dorso-distal corner occupied by a heavy curved tooth, accompanied at the distal edge by a few smaller teeth. Penis-funnel (Pl. XXVIII. f. 41) ventrally produced into a solid pointed cone; penis-sheath dorsally prolonged into a concave, apically rounded process, which is armed just before end by a sharp tooth.

♀. Vaginal plate (Pl. XXI. f. 4) much wrinkled, the proximal mesial part convex, raised in front of the vaginal cavity, forming a kind of roof over it which conceals the opening of the vagina from view; behind the cavity there is a smooth large tubercle, rather abruptly truncate proximally, the plate at both sides of this tubercle concave.

Larva with red oblique side-bands, bordered with white distally; head and horn rugose, not granulose.—Food-plants: *Prunus: Pirus: Syringa:* etc.

Pupa: tongue-case free, 6 mm. long, obviously longer than in *ligustri*; cremaster ending in two rather long points.

Two broods; apparently no seasonal variation.

Hab. Nearctic region.

Two geographical races which are structurally the same.

a. II. drupiferarum drupiferarum.

Sphinx drupiferarum Abbot & Smith, *l.c.*; Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 294. n. 3 (1839); Walker, *List Lep. Ins. B.M.* viii. p. 218. n. 7 (1856); Fitch, *Rept. Ins. N.Y.* iii. p. 362 (1856); Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 172. n. 68 (1859) (Penn.; Mass.; on plum); Morris, *Cat. Lep. N. Am.* p. 18 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 197. n. 6 (1862); Harris, ed. Flint, *Ins. Inj. Veget.* p. 328 (1862); Lintn., *Proc. Ent. Soc. Philad.* iii. p. 658 (1864) (descr. of *l.*); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 165. n. 93 (1865) (Atlantic district); Reed, *Canad. Ent.* iii. p. 5. fig. 1. 2. 3 (*l., p., i.*) (1871) (Ontario, vii viii.); Bowles, *ibid.* p. 143 (1871) (Ontario) (vi.); Lintn., *Ent. Contr.* i. p. 192 & iii. p. 179 (1872) (N.Y., vi., larva on plum viii.); Thaxt., *Psyche* i. p. 30 (1874) (Newton, Mass., vii.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 97. n. 34 (1875); Caulf., *Canad. Ent.* vii. p. 241. n. 14 (1875) (Montreal, common, vi. vii.); Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 104 (1880) (larva); Reed, *Rept. Ent. Soc. Ont.* xii. p. 67. fig. (1882) (metam.); Saund., *Ins. Inj. Fruit* p. 163. f. 170. 171. 172 (1883) (all stages descr.); Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Me., common); Jack., *ibid.* xvii. p. 31 (1885) (Quebec); Fern., *Sphing. N. Engl.* p. 38. n. 14. t. 1. f. 2 (*i.*). 3 (*l.*). 4 (*p.*) (1886); Grote, *Hawk-Moths N. Am.* p. 43 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 177 (1888) (partim); Edw., *Bull. U. St. N. Mus.* xxxvi. p. 47 (1889); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y.; electr. light); Beutenm., *Bull. Amer. Mus. N.H.* vii. p. 300. t. 5. f. 1 (1895) (N.Y.; descr. of *l., p., i.*; on apple, plum, *Celtis*); id., *l.c.* viii. p. 291 (1896) (metam., on *Prunus*); Trum., *Ent. News* viii. p. 27 (1897) (S. Dakota); Hanh., *Canad. Ent.* xxix. p. 292 (1897) (Manitoba); Rowl., *Ent. News* x. p. 11 (1899) (Missouri; on apple, plum); Nash, *ibid.* xi. p. 581. fig. (1900) (fine photo of larva); Fletch., *Rept. Ent. Soc. Ont.* xxx. p. 32. f. 6 (*i.*). 7 (*l.*) (1900); Fern., *Ent. News* xi. p. 581. t. 16 (1900).

♂ ♀. The well-known Atlantic form.

Hab. Canada to Georgia westward to the Mississippi basin; rather common.

In the Tring Museum 4 larvae, 1 pupa, and 8 ♂♂, 11 ♀♀ from: Ontario; Maine; N. Jersey; New York.

b. H. drupiferarum utahensis.

Sphinx utahensis Edwards, *Papilio* i. p. 115 (1881) (Utah, coll. Neumoegen) ; Kirby, *Cat. Lep. Het.* i. p. 692. n. 20 (1892).

Sphinx rancourcensis, Holland (*non* Edwards, 1874), *Canad. Ent.* xviii. p. 103 (1886) (*rancour.*= *drupif.* ex err.).

Sphinx drupiferarum var. *utahensis*, Smith, *Trans. Amer. Ent. Soc.* xv. p. 178 (1888).

♂ ♀. The western form, which is whiter than the ordinary eastern form.

Hab. Colorado to Utah, California, Oregon, probably in all the western States.

In the Tring Museum 10 ♂♂, 5 ♀♀ from : South Dakota; Colorado : Glenwood springs, Colorado springs, and Durango (Oslar).

112. **Hyloicus ligustri.**

Sphinx ligustri Linné, *Syst. Nat.* ed. x. p. 490. n. 7 (1758).

♂ ♀. Antenna one-third (♂) or less than one-third (♀) the length of the forewing, not obviously incrassate before the hook ; apical segments see Pl. LX. f. 9. Spines of foreleg not prolonged, first protarsal segment as long as segments 2 to 4 together ; mesotarsus without comb ; spurs without spines ; hindtibia not spiny, long apical spur more than half the length of the first tarsal segment, this longer than the four other segments together ; paronychium with long slender lobes. The black antemedian band of the hindwing is either isolated, or is more or less merged together with the discal band ; in the latter case the discal band has a more proximal position than in the former. Extreme individuals of the second form are called ab. *spiraeae* ; this is neither local nor is it produced only by such caterpillars as feed on *Spiraea*. In this ab. *spiraeae*, as well as in individuals with separate antemedian band, the hindwing has sometimes very little or no red, reminding one of *H. drupiferarum*. A specimen in the Tring Museum, bred from a larva taken in 1890 at Hemel Hempsted, Herts., by Mr. Arthur Wilson, has the black colour much more developed than any other example we have seen, the greater part of the forewing, the median band of the upperside of the abdomen and the underside of the latter being brownish black ; the discal band of the hindwing is broad, but the antemedian band is distinctly separated from it, though the slightly reddish interspace is, like the postdiscal interstitial band, shaded with brown. A ♂ from Harrow-on-the-Hill has scarcely a trace of pink.

♂. Tenth abdominal tergite long, subcylindrical, gently curved, distally flattened, apex divided into two sharp points (Pl. XXVIII. f. 16) ; sternite (Pl. XXVIII. f. 17) with a very long horizontal lobe divided into two long slender processes, which are cylindrical, tapering to end. Clasper broad, dorsally rounded, ventrally oblique, broadly rounded at end ; harpe (Pl. XXXVIII. f. 19) ending in a broad concave plate, the ventro-distal margin of which is turned up and somewhat notched, while the oblique dorsal edge is irregularly dentate ; the harpe bears some resemblance to that of *Protoparce sesquiplex* (Pl. XXXVI. f. 12). Penis-funnel (Pl. XXVIII. f. 40, p-f) rounded ; penis-sheath (Pl. XXVIII. f. 40) ending in a rather short, broad, obtusely rounded process.

♀. Vaginal plate (Pl. XXI. f. 5) obviously different from that of the allied species ; the mouth of the vagina (v) is proximal, the middle of the postvaginal plate is flat, slightly concave at the sides, convex in middle, smooth, and bordered laterally by an oblique fold, which is often irregularly folded transversely.

Larva resembling that of *drupiferarum*, side-bands deeper red.—Food: *Ligustrum*, *Spiraea*, *Fraxinus*, etc.

Pupa: tongue-case free, elose to the breast, 5 mm. long or less; cremaster with two apical and two subapical points.

Hab. Palaearctic Region, from Scotland and Scandinavia southwards to Spain and Italy, not in Greece; eastwards to Japan.

Bartel, *l.c.*, records it from N.W. Africa and the Canary Islands, giving Speyer as the authority for this statement. Stand. & Rebel mention, with, the Azores as being inhabited by *ligustri*.

Two subspecies:

a. H. ligustri constricta.

**Sphinx constricta* Butler, *Cist. Ent.* iii. p. 113 (1885) (Japan;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 692. n. 24 (1892).

**Sphinx ligustri* var. *amurensis* Oberthür, *Bull. Soc. Ent. Fr.* p. 56 (1886) (Amurld.;—coll. Charles Oberthür); Staud., in Rom., *Mém. Lép.* vi. p. 220. n. 208 (1892) (Amur); Kirby, *l.c.* i. p. 692. sub n. 23 (1892) (Manchuria); Bartel, in Rühl, *Grossschm.* ii. p. 48 (1899).

Sphinx ligustri var. *spiraeae*, Graeser (*non* Esper, 1806), *Berl. Ent. Zeitschr.* xxxii. p. 104. n. 179 (1888) (Amurld., B. vii.).

Sphinx ligustri var. *constricta*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 101 sub n. 734 (1901) (=*amurensis*; Jap., Chin. s., Amur, Uss.).

Sphinx ligustri, Leech, *Proc. Zool. Soc. Lond.* p. 589. n. 35 (1888) (=*constricta*); id., *Trans. Ent. Soc. Lond.* p. 287. n. 63 (1898) (Hakodate, vi.); Bartel, *l.c.* p. 47 (1899) (Japan, "common" ex err.!).

♂♀. Structurally the same as *lig. ligustri*. Agrees in colour with certain specimens of ab. *spiraeae*. The black colour is prominent, the pink colour reduced in intensity. There is as yet very little material in collections.

This form is of interest in so far as it stands intermediate to a certain degree between *drupiferarum* and European *ligustri*. The antemedian and median bands of the hindwing are separate in typical *lig. ligustri*; they are confluent in a few specimens which occur apparently everywhere among typical *lig. ligustri*; the red colour is, besides, occasionally reduced in intensity. In *lig. constricta* the bands are always more or less confluent and the red colour bleached, while in *drupiferarum* both characters are exaggerated, there being no red tint and the two bands being completely fused to one median band, which shows occasionally traces of grey scaling centrally, indicating the original three-banded state.

Hab. N. China, Amurland and Japan, apparantly rare.

In the Tring Museum 2 ♂♂ from: Amurland; Sidemi.

In the collection of Mons. de Joannis from Hien-Hien, N. China.

b. H. ligustri ligustri.

Hoefn., *Arch.* t. 4 (1592); id., *Dir. Ins.* t. 9 (1630); Bouhin, *Traité Anim.* p. 88 (1593); Mouff., *Theatr. Ins.* p. 91. f. 2, p. 182. f. 1 (1634); Jonst., *Hist. Nat. Ins.* t. 19. f. 1. 2 (1653); Merian, *Eur. Ins.* iii. p. 63 n. 124. t. 124 (*l., p., i.*) (1683); Goed., ed. Lister, *Ins.* p. 71. f. 25 (1685); Jung, *Hist. Verm.* p. 108 (1691); Jacob., *Mus. reg. Dan.* t. 1. f. 24 (1696); Raj., *Hist. Ins.* p. 144. n. 1., p. 362. n. 62 (1710); Albin, *Nat. Hist. Engl. Ins.* t. 7 (1720); (Anonym.), *Bresl. Samml. Julius Cl.* 4. Art. 4. n. 6 fig. (*i., p., l.*) (1723); Réaum., *Hist. Mém.* i. p. 293. t. 14. f. 1 (1734); id., *l.c.* ii. 2. p. 1. t. 20. f. 1–4 (1736) (Sphinx!); Swamm., *Bibl. Nat.* p. 223. 388. 389. t. 29. f. 1 (*l.*). 2 (*p.*). 3 (*i.*). (1737); Linné, *Fauna Suec.* ed. i. p. 248. n. 809 (1746); Wilke, *Engl. Moths*, Cl. i. S. B. p. 10. t. 3 (1747); Rösel, *Ins. Bel.* iii. p. 25. t. 5. f. 4. 5 (1755); Hemm., *Coll. Cur. Ins.* t. 3. f. a. b. (1751?); Gronov., *Act. Helv.* v. p. 140. n. 311 (1762); Geoffr., *Hist. Ins.* ii. p. 84. n. 7 (1762); Gronov., *Zooph.* p. 202. n. 820 (1764); Seba, *Thesaur.* iv. t. 53. f. 12. 14., t. 55., f. 13. 14. 15. (fig. malae), t. 60. f. 19.

20 (1765) ; Harris, *Aurel.* p. 3. t. 2. f. a–g (1766) ; Deg., *Mém. Hist. Ins.* i. p. 14. t. 1. f. 6 (*l.*) (1752) ; id., *l.c.* ii. p. 238. n. 5 (1771) ; Ern. & Engr., *Pap. Eur.* iii. p. 9. t. 85. f. 113. a–g (1785).

Sphinx ligustri Linné, *Syst. Nat.* ed. x. p. 490. n. 7 (1758) ; id., *Fauna Suec.* ed. ii. p. 287. n. 1087 (1761) ; Sepp, *Nederl. Ins.* i. 3. p. 15. t. 3. f. 1–5 (egg, *ll.*). t. 4. f. 1 (*p.*). 2. 3 (*l.*) (1762) ; Scop., *Ent. Carn.* p. 185. n. 470 (1763) ; Linné, *Mus. Lud. Ulr.* p. 347 (1764) ; Müll., *Fauna Fridr.* p. 37. n. 344 (1764) ; Houtt., *Naturl. Hist.* i. 11. p. 417. n. 7 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 799. n. 8 (1767) ; Beckm., *Epitom.* p. 160. n. 6 (1772) ; Müll., *Naturs.*, v. 1. p. 638. n. 8 (1774) ; Goeze, *Bonnet's* etc. *Abh.* p. 95. n. 6. note (1773) ; Gleditsch, *Forstweissensch.* i. p. 272 (1775) ; id., ii. p. 163. n. 1. p. 194. n. 2 (1775) ; Harr., *Engl. Lep.* p. 30. n. 205 (1775) ; Fabr., *Syst. Ent.* p. 545. n. 28 (1775) ; Fuessl., *Verz. Schweiz. Ins.* p. 32. n. 615 (1775) ; Müll., *Zool. Dan.* p. 116. n. 1337 (1776) ; Schiff. & Den., *Wien. Verz.* p. 41. n. 2 (1776) ; Mad., ed. Kleem., *Raupenkal.* p. 62. n. 175, p. 79. n. 227 (1777) ; Meyer, in Fuessl., *Mag. Ent.* i. p. 265 (1778) ; Esp., *Eur. Schm.* ii. p. 61. t. 6 (1779) & p. 226. t. 36. f. 7. (egg) (1782) ; Blum., *Handb. Naturg.* p. 364. n. 4 (1779) ; Goeze, *Ent. Beytr.* iii. 2. p. 151. n. 8 (1780) ; Fabr., *Spec. Ins.* ii. p. 150. n. 47 (1781) ; Lang, *Verz. Augsb.* p. 67. n. 553. 554 (1782) ; Retz., *Gen. Ins.* p. 34. n. 31 (1783) ; Fourcr., *Ent. Paris.* ii. p. 253. n. 7 (1785) ; Fabr., *Mant. Ins.* ii. p. 97. n. 51 (1787) ; Borkh., *Eur. Schm.* ii. p. 92. n. 2, p. 146. n 12, p. 180. n. 11 (1789) ; Rossi, *Fauna Etr.* ii. p. 163. n. 1056 (1790) ; View., *Verz. Brandenb.* i. p. 9. n. 12 (1790) ; Gmel., *Syst. Nat.* i. 5. p. 2377. n. 8 (1790) ; Schwarz, *Raupenkal.* p. 199. 355. 496. 634 (1791) ; Borkh., *Rhein. Mag.* i. p. 317. n. 145 (1793) ; Panz., *Fauna Germ.* p. 8. n. 17 (1793) ; Fabr., *Ent. Syst.* iii. i. p. 374. n. 55 (1793) ; Prunn., *Lep. Ped.* p. 83. n. 169 (1798) ; Donov., *Brit. Ins.* viii. p. 79. t. 284 (1799) ; Schrank, *Fauna Boica* ii. 1. p. 223. n. 1385 (1798–1804) ; Walk., *Faune Paris. Ins.* ii. p. 279 (1802) ; Thunb., *Mus. Nat. Ups.* xxiii. p. 10 (1804) ; Bechst. and Scharf., *Forstins.* ii. p. 341. n. 6 (1805) ; Hübn., *Samml. Eur. Schm., Schw.* p. 98. n. 4. t. 14. f. 69 (♀) & t. 31. f. 143 (1805 24) ; Turt., *Syst. Nat.* iii. 2. p. 176. (1806) ; Hübn., *Gesch. Eur. Schm.* ii. *Sphing.* iii. Leg. Cl. f. 2a. h. c. (1806–18) ; Rossi, ed. Illig., *Fauna Etr.* p. 262. n. 1056 (1807) ; Nag., *Hülfsh. Schm.* p. 154 (1818) ; Sam., *Ent. Comp.* p. 244 (1819) ; God., *Lép. France* iii. p. 22. n. 3. t. 15 (1821) ; Lep. & Serv., *Enc. Méth.* x. p. 465. t. 65. f. 4. 6 (1825) ; Meig., *Handb. Schm.* p. 99. n. 15 (1827) ; Steph., *Illustr. Brit. Ins., Haust.* i. p. 121. n. 5 (1828) ; Boisd., *Ind. Meth.* p. 48. n. 393 (1829) ; Steph., *Cat. Brit. Ins.* ii. p. 32 (1829) ; Meig., *Syst. Beschr. Eur. Schm.* ii. p. 142. n. 13 t. 67. f. 1 (1830) ; Cant., in Silb., *Rev. Ent.* i. p. 77 (1833) (Dépt. Var, vi., ix.) ; Beske, *ibid.* ii. p. 177 (1834) (Hamburg) ; Friv, *ibid.* ii. p. 181 (1834) (Hungary) ; Luc., *Lép. Eur.* p. 115. t. 47 (1834) ; Thon, *Nat. Schm.* t. 54. f. 738. 739. 740 (1837) ; id. & Reich., *Ins. Krebse Spinn.* p. 107. t. 54. f. 738. 739. 740 (1838) ; Blanch., *Hist. Nat. Ins.* iii. p. 479 (1840) ; Frey., *N. Beitr. Schm.* iv. p. 39. n. 516. t. 313. f. 1 (1842) ; Westw. & Humphr., *Brit. Moths* p. 13. t. 3. f. 4. 5. 6. (1843) ; Eversm., *Fauna Volgo-Ural.* p. 112 (1844) (v. vi.) ; Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847) ; Herr.-Sch., *Eur. Schm.* ii. 1. p. 90. n. 26 (1847) ; Bruand, *Bull. Soc. Ent. Fr.* p. 43 (1849) (pupa lying 4 years) ; Lab., *Bull. Soc. Ent. Fr.* p. 50 (1850) ; Walk., *List Lep. Ins. B.M.* viii. p. 214. n. 2 (1856) ; Vill., *Bull. Soc. Ent. Fr.* p. 159 (1859) (on *Paulownia*) ; Mann, *Wien. Ent. Monatschr.* iii. p. 92 (1859) (Sicily) ; Praun, *Eur. Schm., Sphing.* t. 6. n. f. 5 (1860) ; Com., *Ent. Weekly Int.* viii. p. 203 (1860) (on holly) ; Wilde, *Pfl. & Raup.* ii. p. 85. t. 2. f. 31 (1861) ; Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.) ; Mann, *Wien. Ent. Monatschr.* vi. p. 66 (1862) (Brussa) ; Wallengr., *Skand. Het. Fjär.* p. 32. n. 2 (1863) ; Led., *Wien. Ent. Monatschr.* vii. p. 22 (1863) (Bulg. ; Rumel.) ; Ball., *Bull. Moscou* p. 364 (1864) (Gorki) ; Cliff., *Zoolog.* xxii. p. 8906 (1864) ; Gasc., *ibid.* p. 8968 (1864) ; Crewe, *ibid.* p. 9054 (1864) (larva) ; Paris, *Bull. Soc. Ent. Fr.* p. 39 (1865) ; Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Snell., *Vlind. Nederl.* p. 98 (1867) (vi. vii.) ; Girard., *Bull. Soc. Ent. Fr.* p. 47 (1867) (musk secret.) ; MacLachl., *Ent. Mo. Mag.* iii. p. 137 (1867) ; Duer, *ibid.* p. 163 (1867) (on holly) ; Briggs, *ibid.* p. 206 (1867) (on holly) ; Newm., *Entom.* iii. p. 34 (1867) (descr. of larva) ; Tengstr., *Act. Soc. F. F. Fenn.* x. p. 6. n. 91 (1869) ; Braine, *Entom.* iv. p. 322 (1869) (on *Salix*) ; Nix, *ibid.* p. 322 (1869) (Agamogenesis) ; Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 68 (1870) (Breda) ; Clogg, *Entom.* v. p. 356 (1871) (Agamogenesis) ; Brutt., *Progr. Gymn. Dorpat* p. 23. n. 3 (1872) (vi. vii.) ; Clogg, *l.c.* vi. 30 (1873) ; id., *l.c.* p. 231 (1873) (Agamogenesis) ; Harw., *ibid.* p. 411 (1873) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 96. n. 33 (1875) ; Noll, *Zoolog. Gart.* xvi. p. 114 (1875) (Canaries) ; Siebke, *Enum. Ins. Norr.* iii. p. 23. n. 2 (1876) ; Girard., *Bull. Soc. Ent. Fr.* p. 179 (1876) (larva ; flâcherie) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 620. n. 16 (1877) ; Coop., *Entom.* xi. p. 20. (1878) ; Bign., *ibid.* p. 274 (1878) (paras.) ; Weil., *Progr. Oberrealsch. Innsbr.* p. 15 (1880) (Tauferer Thal) : Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 44 (1880) ; Reich., *Ent. Nachr.* vi. p. 141. (1880) (scent-org.) ; Fügn., *ibid.* p. 160 (1880) (scent-organ) ; Bertk., *ibid.*

p. 206 (1880) (scent-organ) ; Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. v. p. 130. n. 165. (1882) (revision) ; Rom., *Mém. Lép.* i. p. 69 (1884) (Borjom ; Tiflis ; Derbent) ; Lampa, *Ent. Tidskr.* vi. p. 26. n. 111 (1885) ; Ponj., *Bull. Soc. Ent. Fr.* p. 165 (1885) (éclos.) ; Poult., *Trans. Ent. Soc. Lond.* p. 281 (1885) (postembr. devel.) ; id., *l.c.* p. 137 (1886) (devel. of col.) ; Amel., *Berl. Ent. Zeitschr.* xxxi. p. 261 (1887) (Dessau) ; Mina-Pal. & Failla-Ted., *Nat. Sic.* vii. p. 41 (1889) (if occurr. ?) ; Kirby, *Cat. Lep. Het.* i. p. 692. n. 23 (1892) ; Bartt., *Lep. Brit. Isl.* ii. p. 31. n. 3. t. 47. f. 1. a c (1893) ; Hofm., *Raup. Grossschm.* p. vii. f. 2 (embr.) p. 28. t. 7. f. 2 (1893) ; id., *Grossschm.* p. 29. t. 16. f. 22 (1894) ; Pfitz., *Iris* x. p. 160 (1897) (Sprottau, pale hindwg.) ; Vos, *Tijdschr. Ent.* xli. p. 79 (1898) (Apeldoorn) ; Bartel, in Rühl, *Grossschm.* ii. p. 43 (1899) ; Stand. & Reb., *Cat. Lep.* ed. iii. p. 100. n. 734 (1901).

Sphinx spiraeae Esper, *Eur. Schm.* ii. *Suppl.* p. 21. n. 72. t. 42. f. 1 (1806).

Herse ligustri, Oken, *Lehrb. Naturg.* iii. 1. p. 762. n. 2 (1815) (=*spiraeae*).

Sphynx ligustri, Vogel, *Schm. Cabin.* i. p. 23. t. 5. f. 3 (1821).

Sphinx ligustre (!), Lalanne, *Man. Ent.* p. 116. n. 5 (date ?).

Hab. Europe eastwards to Asia Minor and Central Asia.

In the Tring Museum a number of larvae and pupae and a long series of imagines from various localities.

Noll, *l.c.*, says that *ligustri* was very common at flowers between 8 and 9 p.m. at Teneriffe. Was it really *ligustri* and not *Herse convolvuli* ?

113. **Hyloicus dolli** (Pl. XIII. f. 11, ♂).

Sphinx (*Hyloicus*) *dolli* Neumoegen, *Papilio* i. p. 149 (1881) (Prescott, Ariz.).

Sphinx dolli, Grote, *New Check List* p. 11 (1882).

Hyloicus dolli, Kirby, *Cat. Lep. Het.* i. p. 694. n. 10 (1892).

♂ ♀. Antenna longer than in the allies of *chersis* and *drupiferarum*, half the length of the forewing. Tongue rather weak. Palpus not prominent. Spines of forelegs comparatively as stout as in *chersis* and longer, apical spine of segment 1 about as long as segment 3 ; spurs of mid- and hindtibia very short, not or little longer than the tibia is broad ; first segment of hindtarsus much shorter than tibia, also shorter than the four other segments together. Cross-veins of hindwing often straight. Paronychium reduced, without lobes ; claws long and slender. Comb of midtarsus with one or two prolonged bristles.

♂. Tenth abdominal tergite long, slender, compressed, gently curved, pointed, subsulcate beneath ; sternite with a broad, slightly curved, flat, mesial lobe which somewhat narrows towards the sinuate apex. Clasper strongly rounded, dilated dorsally in middle, thence narrowed to apex (Pl. XXXVIII. f. 9) ; harpe with a single, broad, somewhat spatulate, concave process, dentate at the edge, upper margin continuous with the subdorsal fold of the clasper and, like the fold, clothed with very long bristles. Penis-sheath curved and somewhat twisted (Pl. XXVIII. f. 54), ending in a broad, pointed process.

Early stages not known.

Hab. Arizona ; Colorado ; Utah.

Two subspecies :

a. H. dolli coloradus (Pl. XIII. f. 11, ♂).

Sphinx coloradus Smith, *Ent. Amer.* iii. p. 153 (1887) (Colorado) ; Edw., *ibid.* p. 223 (1888) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 189 (1888) ; Neum., *Ent. News* iv. p. 134 (1893) (local form of *dolli*).

♂. Forewing above with black submarginal line R^2—M^2.

Hab. Colorado ; Utah.

In the Tring Museum 9 ♂♂ from : Utah ; Colorado : Glenwood Springs, Golden, Garfield county.

b. H. dolli dolli.

Sphinx dolli Neumoegen, *l.c.*; Smith, *l.c.* xv. p. 189 (1888) (Prescott); Ottol., *Ent. News* vi. p. 218 (1895) (in coll. Neumoeg.).

♂. Forewing without black submarginal line R^2—M^2.

Hab. Arizona.

Not seen.

114. Hyloicus sequoiae (Pl. XIII. f. 8, ♂).

Anceryx coniferarum, Walker (*non* Abbot & Smith, 1797), *List Lep. Ins. B. M.* viii. p. 224. n. 2 (1856) (partim).

**Sphinx sequoiae* Boisduval, *Ann. Soc. Ent. Belg.* xii. p. 66. n. 70 (1868) (Calif.;—coll. Charles Oberthür); Edw., *Proc. Calif. Ac. Sci.* iv. p. 110 (1874) (Bear Valley, S. Nevada, vi.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 101. n. 39 (1875); Streck., *Lep. Rhop. Het.* p. 117. t. 13. f. 17 (1876); Edw., *Papilio* iii. p. 25 (1883) (Butte C°, vii., at night); Riv., *ibid.* p. 65 (1883) (Berkeley, Calif., at flowers, iv.); Smith, *Trans. Amer. Ent. Soc.* xv. p. 188 (1888) (Calif.).

Hyloicus sequoiae, Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 27 (1874); id., *l.c.* ii. p. 228. n. 70 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 616. n. 2 (1877) (U. St.); Grote, *l.c.* iii. p. 225. n. 73 (1877) (Calif.).

♂ ♀. Antenna rather shorter than in *dolli*, strongly narrowed basad, widened distally, very distinctly club-shaped in ♀. Spines of foreleg shorter and less stout than in *dolli*, spurs of mid- and hindtibia a little longer. Paronychium with a short but distinct lobe. Palpus not prominent.

♂. Tenth abdominal tergite slender, long, gently curved, with almost parallel sides, abruptly narrowed to a point (Pl. XXVIII. f. 11, a); lobe of sternite (Pl. XXVIII. f. 11, b) rather deeply sinuate, the two halves sharply pointed. Clasper (Pl. XXXVIII. f. 7) dilated dorsad in middle, thence strongly narrowed to end, the edge irregularly undulate; harpe with a single, almost flat, broad process, heavily but irregularly dentate at the distal edge, the teeth long, sharp, often bearing a smaller tooth, the upper edge of the harpe continuous with the broad subdorsal fold of the clasper and, like the fold, clothed with long bristles. Penis-sheath (Pl. XXVIII. f. 53) similar to that of *vancouverensis*, but the apical process much broader proximally.

♀. Vaginal plate (Pl. XX. f. 22) reminding one to a certain extent of that of *P. lefeburei* (Pl. XX. f. 1); mouth of vagina subapical, behind it there is an ovate, not much raised, tubercle; the edge of the cavity is rugose and bears, like the lateral part of the plate, dispersed long slender scales, which are situated on granules; the plate is transverse, with the ventro-lateral edges somewhat prominent, being distinctly raised above the level of the membrane connecting the plate with the seventh sternite; on this membrane there is on each side a chitinised half-ring, more or less interrupted laterally.

Early stages not described.

Hab. Pacific Subregion of Nearctic Region: California, probably farther north.

In the Tring Museum 15 ♂♂, 8 ♀♀ from California: Sacramento, August; Central Calif., July.

115. Hyloicus crassistriga spec. nov.

Kentrochrysalis streckeri, Leech (*non* Staudinger, 1880), *Trans. Ent. Soc. Lond.* p. 290 (1898) (partim).

♀. Tongue short and weak. Palpus slender, rough-haired. Antenna thickened distally, with a large brown patch, occupying the greater part of the dorsal surface. Fore- and midtibiae with very few spines at the end. Paronychium without lobes.

Body *above* pale brown, palest on the sides. A black oblique line on each side from base of antenna to collar; edge of collar and upper edge of mesothoracic tegula rather broadly black, especially the latter; abdomen (rather soiled) with a black mesial line and black lateral patches. *Underside* cinnamon bistre brown; first segment of palpus pale.

Wings *above*.——Forewing: wood-brown, with the following brownish black markings: two very oblique antemedian costal lines across apex of cell, followed by a short streak in cell, and continued from M^2 to inner margin, which they reach about 5 mm. from base, connected with base by a streak, interspace filled up with black behind; two heavy discal streaks R^3—M^2, the upper one the longer, a third streak R^1—R^2 more oblique; the discal lines crossed by these streaks not well expressed, being represented by blackish brown clouds or patches, the lines coming out more clearly beyond M^2; a heavy, oblique, apical line; some small submarginal spots; fringe brownish black with white dots.——Hindwing: mummy brown, paler towards base; fringe spotted with white.

Underside mummy brown, somewhat greyish.——Forewing with a vestigial discal band nearer distal margin than cell, a thin apical line.——Hindwing with two vestigial distal bands.

♀. Vaginal plate (Pl. XXI. f. 11) resembling somewhat that of *ligustri*; mouth of vagina proximal, a small folded ridge in front of it, the ridge continued on both sides as a longitudinal fold to apex of plate.

Length of forewing 38 mm.

Hab. Japan.

One specimen in the British Museum, ex coll. Leech.

116. Hyloicus pinastri.

Sphinx pinastri Linné, *Syst. Nat.* ed. x. p. 492. n. 20 (1758).
Hyloicus pinastri, Hübner, *Verz. bek. Schm.* p. 139. n. 1483 (1822).
Anceryx pinastri, Walker, *List Lep. Ins. B. M.* viii. p. 223. n. 1 (1856).
**Hyloicus asiaticus* Butler, *Proc. Zool. Soc. Lond.* p. 260. n. 58 (1875) (Scinde? ;—Mus. Brit.).
Sphinx saniptri Strecker, *Lep.* p. 118. t. 13. f. 18 (1876).

♂♀. Antenna three-sevenths (♂) or a little more than one-third (♀) the length of the forewing, slightly incrassate distally. Palpus not so much produced as in *chersis* and allies, rather slender, especially in ♀. Armature of foreleg weak, none of the spines obviously prolonged; foretibia only with a few apical and lateral spines, first tarsal segment as long as the next three together; midtarsus without comb, the proximal spines of row 4 not being essentially longer than the more distal spines; hindtibia without spines: spurs long, with or without spines, long distal one of hindtibia two-thirds or three-fourths the length of the first tarsal segment; this longer than the four other segments together.

♂. Tenth abdominal tergite rather strongly curved, broad, tapering to a point, somewhat flattened and sulcate above, concave beneath (Pl. XXVIII. f. 18); sternite completely divided into two narrow, somewhat curved, lobes. Clasper sole-shaped, rounded-narrowed from before middle to apex; harpe (Pl. XXXVIII. f. 11. 12) with two processes, a ventral one which is broad, obtuse, and a much longer upper one which is cylindrical or flattened, tapering to the pointed end, somewhat curved, pointing ventro-distad. Penis-sheath (Pl. XXVIII. f. 49. 50) apically produced into a concave process.

♀. Vaginal plate (Pl. XXI. f. 6) elongate-triangular, rounded distally; mouth of vagina median, covered proximally by a prominent flap, which is individually variable; behind the vaginal opening there is a large smooth mesial tubercle.

Larva without the oblique bands of other *Hyloicus*, with longitudinal dashes, and strongly marked ringlets; head, frontal surface excepted, horn and anal segment granulose.—Food: various *Coniferae*.

Sheath of tongue of chrysalis short, free, appressed to the breast.

Hab. Palaearctic Region; also in N. America (introduced).

In the Brit. Mus. there is a ♂ collected by Doubleday in the United States. This specimen does not differ from European ♂♂. The *saniptri* of Strecker is doubtless the same. These North American *pinastri* are surely introduced specimens, or offspring of such, as the sexual armature—which is identical in Doubleday's ♂ with that of European examples—does not show any difference, while we should expect it to differ obviously, if the Nearctic *pinastri* had been an inhabitant of that region for a longer period.

As the species occurs in Europe and Japan, it will most likely also be found in China, Thibet and Kashmir, and at the south side of the Himalayas at higher elevations.

a. II. pinastri pinastri.

Réaum, *Mém.* i. t. 13. f. 8 (1734); Roesel, *Insect. Belust.* i. 1. p. 41. t. 6 (1746); Gadd., *Obs. Satagund.* p. 28 (1747); Hemm., *Coll. Cur. Ins.* t. 2. f. a. b. (175–?); Schaeff., *Icon. Ratisb.* t. 110. f. 1. 2 (1766); Deg., *Mém. Hist. Ins.* ii. 1. p. 234. n. 1 (1771); id., *l.c.* iv. p. 169. 695. t. 10. f. 1. 2. 3. (1774); Ern. & Engr., *Pap. Eur.* iii. p. 17. t. 97. f. 115. f. a–f (1785).

Sphinx pinastri Linné, *Syst. Nat.* ed. x. p. 492. n. 20 (1758); id., *Fauna Succ.* p. 288. n. 1088 (1761); Poda, *Mus. Graec.* p. 80. n. 4 (1761); Sepp., *Nederl. Ins.* t. 3. p. 23. f. 5 (1762); Scop., *Ent. Carn.* p. 187. n. 473 (1763); Hufn., *Berlin. Mag.* ii. p. 182. n. 10 (1766); Houtt., *Naturl. Hist.* i. 11. p. 450. n. 20 (1767); Linné, *Syst. Nat.* ed. xii. p. 802. n. 22 (1767); Drury, *Illustr. N. Hist.* i. p. 58. t. 25. f. 2 (1770); Forst., *Cat. Anim. N. Am.* p. 29 (1771); Müll., *Naturs.* v. 1. p. 642. n. 22 (1774); Fabr., *Syst. Ent.* p. 541. n. 16 (1775); Fuessl., *Verz. Schweiz. Ins.* p. 33. n. 621 (1775); Schiff. & Den., *Wien. Verz.* p. 41 (1776); Mad., ed. Kleem., *Raupenkal.* p. 71. n. 202 & p. 87. n. 249 (1777); Meyer, in Fuessl., *Mag. Ent.* i. p. 266 (1778); Goeze, *Ent. Beytr.* iii. 2. p. 174. n. 22 (1780); Fabr., *Spec. Ent.* ii. p. 146. n. 30 (1781); Lang, *Verz. Augsb.* p. 67. n. 555–557 (1782); Esp., *Eur. Schm.* ii. p. 106. n. 12. t. 12. f. 1. 2. 3 (1779) & p. 233. t. 36. f. 9 (1782); Retz., *Gen. Ins.* p. 33. n. 27 (1783); Fuessl., *N. Mag. Ent.* iii. p. 157. n. 130, p. 158. n. 139 (1786); Fabr., *Mant. Ins.* ii. p. 95. n. 33 (1787); Borkh., *Eur. Schm.* ii. p. 101. n. 4, p. 147, p. 180. n. 3 (1789); Gmel., *Syst. Nat.* i. 5. p. 2385. n. 22 (1790); View., *Tab. Verz. Brandenb.* i. p. 6. n. 6 (1790); Brahm, *Insectenkald.* ii. 1. p. 127. n. 63 (1791); Schwarz, *Raupenkabl.* p. 496. n. 633 (1791); Panz., *Fauna Germ.* p. 82. n. 22 (1793); Fabr., *Ent. Syst.* iii. 1. p. 367. n. 35 (1793); Borkh., *Rhein. Mag.* i. p. 317. n. 144 (1793); Cederh., *Fauna Ingr.* p. 213. n. 653 (1798); Schrank, *Fauna Boica* ii. p. 224. n. 1386 (1798–1804) Beebst. & Scharf., *Forstins.* ii. p. 339. n. 5 (1805); Hübn., *Eur. Schm., Sphing.* p. 98. n. 1. t. 13. f. 67 (♂) (1805–24); Ochs., *Schm. Eur.* ii. p. 243. n. 4 (1808); Hübn., *Gesch. Eur. Schm.* ii. *Sph.* iii. *Leg. C. b.* f. 1. a (1806–18); Nag., *Hülfsb. Schm.* p. 158 (1818); Sam., *Ent. Comp.* p. 244 (1819); Vogel, *Schm. Cabin.* i. p. 26. t. 7. f. 5. a. b. (1821); God., *Hist. Nat. Lép.* iii. p. 30. t. 17. f. 1 (1821); Lep. & Serv., *Enc. Méth.* x. p. 464. t. 64. f. 1–3 (1825); Meig., *Handb. Schm.* p. 99. n. 16 (1827); Boisd., *Ind. Meth.* p. 48. n. 392 (1828); Steph., *Illustr. Brit. Ins., Haust.* i. p. 121. n. 6 (1828); id., *Cat. Brit. Ins.* ii. p. 32 (1829); Meig., *Syst. Beschr. Eur. Schm.* ii. p. 145. n. 16. t. 67. f. 3 (1830); Cant., in Silb., *Rev. Ent.* i. p. 77 (1833) (*Dépt. Var*, v. ix.); Beske, *ibid.* ii. p. 177 (1834) (Hamburg); Lucas, *Lép. Eur.* p. 116. t. 46. f. 3 (1834); Thon, *Nat. Schm.* t. 54. f. 741. 742. 743 (1837); id. & Reich., *Ins. Krebse Spinn.* p. 107. t. 54. f. 741. 742. 743 (1838); Ratzeb., *Forstins.* ii. p. 74 (1840); Zett., *Ins. Lapp.* p. 917 (1840); Westw. & Humphr., *Brit. Moths* p. 13. t. 3. f. 7. 8. 9 (1843); Eversm., *Fauna Volgo-Ural.* p. 112 (1844) (vi.); Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847); Bell., *Bull. Soc. Ent. Fr.* p. 52 (1848) (Bois de Boulogne); Ménétr., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 89. n. 1474 (1857) (Curland,

Livland, St. Petersb.) ; Praun, *Eur. Schm., Sphing.* t. 6. D. f. 4 (1860) ; Wilde, *Pfl. & Raup.* ii. p. 84. t. 2. f. 34 (1861) ; Kirchn., *Lotos* xi. p. 103 (1861) ; Sealy, *Proc. Ent. Soc. Lond.* v. p. 106 (1861) ; Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.) ; Wallengr., *Skand. Het. Fjär.* p. 34. n. 3 (1863) ; Ball., *Bull. Moscou* p. 364 (1864) (Gorki) ; Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Snell., *Vlind. Nederl.* p. 98 (1867) (vi.–viii.) ; Hinterw., *Progr. Oberrealsch. Innsbruck* p. 229 (1868) ; Tengstr., *Act. Soc. F. F. Fenn.* x. p. 6. n. 92 (1869) ; Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 69 (1870) (Breda) ; Brutt., *Progr. Gymn. Dorpat* p. 23. n. 4 (1872) (v.–vii.) ; Spill., *Entom.* vi. p. 103 (1873) (Crewkerne) ; Gurd., *ibid.* ii. p. 127 (1873) (Devonshire) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 104. n. 43 (1875) ; Siebke, *En. Ins. Norv.* iii. p. 23. n. 3 (1876); Wrat., *Entom.* x. p. 135 (1877) (Suffolk) ; Mill., *ibid.* p. 210 (1877) ; Frere, *ibid.* x. p. 210 (1877) ; Staint., *Ent. Mo. Mag.* xiv. p. 67 (1878) (Ipswich) ; Tayl., *ibid.* xiv. p. 136 (1878) (Ipswich) ; id., *l.c.* xvi. p. 93 (1880) (capt. in Britain) ; Thed., *Ent. Tidskr.* i. p. 197 (1880) (Sweden) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 44 (1880) ; Weil., *Progr. Oberrealsch. Innsbr.* p. 15 (1880) (Tauferer Thal) ; Rom., *Mém. Lép.* i. p. 69 (1884) (Borjom ; Tiflis ; Manglis) ; Lampa, *Ent. Tidskr.* vi. p. 26. n. 112 (1885) ; Kroul., *Bull. Soc. Oural.* xi. p. 212. n. 86 (1885) (Sarapoul, vi. ½ vii.) ; id., *l.c.* xi. p. 239. n. 56 (1885) (Ourjoum) ; Buckl., *Larv. Brit. Lep.* ii. p. 27. t. 22. f. 3 (1887) ; Amel., *Berl. Ent. Zeitschr.* xxxi. p. 261 (1887) (Dessau) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 186 (1888) (doubts ident. of *saniptri* with *pinastri*) ; Bartt., *Lep. Brit. Isl.* ii. p. 27. t. 46 (1893) ; Hofm., *Raup. Grossschm.* p. 28. t. 7. f. 1 (1893) ; id., *Grossschm.* p. 29. t. 16. f. 21 (1894) ; Kill. & Cafl., *Jahrb. Nat. Ges. Graub.* xxxviii. App. p. 19 (1895) ; Vos, *Tijdschr. Ent.* xxxi. p. 79 (1898) (Apeldoorn) ; Bartel, in Rühl, *Grossschm.* ii. p. 48 (1899) ; Burst., *Zeitschr. Ent.* vi. p. 164. f. 1. 2 (1901).

Sphinx pinastri et *piceae*, Gleditsch, *Forstwissensch.* i. p. 501. n. 1 (1775).

Herse pinastri, Oken, *Lehrb. Naturg.* iii. 1. p. 762. n. 3 (1815).

Hyloicus pinastri, Hübner, *Verz. bek. Schm.* p. 139. n. 1483 (1822) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 616. n. 1 (1877) (England ; Europe !) ; Kirby, *Cat. Lep. Het.* i. p. 693. n. 1 (1892) ; id., in Allen, *Nat. Libr., Moths* iv. p. 49. t. 107. f. 3 (1897) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 101. n. 736 (1901) (partim ; " Japan " alia spec.)

Anceryx pinastri, Walker, *List Lep. Ins. B. M.* viii. p. 223. n. 1 (1856) (partim ; " Scinde " loc. err., " N. Ind." spec. alt.) ; Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 265. t. 6. f. 53. 54 (1882) (larva).

**Hyloicus asiaticus* Butler, *Proc. Zool. Soc. Lond.* p. 260. n. 58 (1875) (Scinde ?—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 616. n. 3 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 693. n. 4 (1892) (Sind ?) ; Hamps., in Blanf., *Fauna Brit. India, Moths* i. p. 123 (1892) (=*pinastri* ; loc. err.).

Sphinx saniptri Strecker, *Lep.* p. 118. t. 13.f. 18 (1876) (Canada ; Penn.) ; id., *l.c.* p. 143 (1877) (=*pinastri*) ; Edw., *Ent. Amer.* iii. p. 223 (1888).

Sphinx pinastri ab. *fasciata* Lampa, *Ent. Tidskr.* vi. p. 26 (1885) (Scandin.).

Hyloicus saniptri, Kirby, *Cat. Lep. Het.* i. p. 693. n. 2 (1892) (N. Am.).

♂ ♀. The individual variability in colour resp. intensity of pattern is well known. Some specimens are nearly all brown. Some individuals from Corsica in the collection of Mons. Charles Oberthür have no bands on the forewing while the streaks R^3—M^2 are heavy. Paronychium mostly with a short triangular side-lobe. Upper process of harpe cylindrical, long (Pl. XXXVIII. f. 11). Apical process of penis-sheath (Pl. XXVIII. f. 50) broad, tapering, somewhat curved, pointed.

♀. Flap in front of vaginal orifice feebly or not at all sinuate.

Hab. Europe: England, Scandinavia, southwards to Spain and Greece, eastwards to Transcaspia; a mountain insect in the southern districts in accordance with the distribution of the *Coniferae*. Not found in N. Africa, but probably occurring in the Atlas Mountains at higher elevations. A ♀ from Düsseldorf in the collection of Charles Oberthür has the body and wings almost uniformly brownish black ; a similar specimen in the Tring Museum.

In the Tring Museum a series from various localities.

b. H. pinastri morio subsp. nov. (Pl. XIII. f. 9, ♂).

♂. Pale lateral markings of abdomen small, dorsum of thorax and abdomen brown ; pale area of palpus restricted ; wings above deeper brown than in ordinary

pinastri ; SC^2 and R^1 of hindwing from upper angle of cell, very shortly stalked together, the stalk much shorter than in *pin. pinastri.*

♂. The lobes of the tenth sternite broader and shorter than in *pin. pinastri.* The upper process of the harpe (Pl. XXXVIII. f. 12) flattened, not rolled in to form a cylinder, shorter than in *pin. pinastri,* the lower process more horizontal, more curved at end. Process of penis-sheath (Pl. XXVIII. f. 49) remarkably different, being short, strongly curved at end, pointed, almost hooked.

Hab. Japan.

One ♂ in the Tring Museum from Japan ; it was in a collection of Japanese Lepidoptera, of which the special locality was not given.

117. Hyloicus caligineus.

**Hyloicus caligineus* Butler, *Ann. Mag. N. H.* (4). xx. p. 393 (1877) (Yokohama ;—Mus. Brit.).
Anceryx pinastri, Leech, *Proc. Zool. Soc. Lond.* p. 588. n. 32 (1888).
Hyloicus caliginosus (!), Kirby, *Cat. Lep. Het.* i. p. 693. n. 3 (1892).
Hyloicus pinastri, Leech, *Trans. Ent. Soc. Lond.* p. 287. n. 64 (1898).

♂ ♀. Differs from *pinastri*, apart from colour, chiefly in the following points : foretibia with fewer spines, midtibia without any spines except some minute apical ones, which are sometimes also wanting, first metatarsal segment shorter than the tibia and as long as the four other segments together, long apical spur of hindtibia less than *half* the length of the first tarsal segment ; antenna proportionately longer ; hindwing less elongate.

♂. Tenth abdominal tergite (Pl. XXVIII. f. 19) longer and much narrower than in *pinastri* ; sternite sinuate, not completely divided mesially. Clasper more rounded ; harpe (Pl. XXXVIII. f. 13. 14) as in *pinastri* with two processes, but both shorter, the upper one branching off from the dorsal margin of the other.

♀. Vaginal plate as in *pinastri* with a prominent lobe in front of the vaginal orifice (Pl. XXI. f. 7. 8), the lobe longer and narrower than in *pinastri*, individually variable.

Larva and pupa not known.

Hab. Japan and China.

Two subspecies.

The paucity (or even absence) of spines on the midtibia is a very remarkable character.

a. H. caligineus caligineus.

**Hyloicus caligineus* Butler, *l.c.* ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* ii. p. 2. t. 21. f. 6 (1878).
Anceryx pinastri, Leech, *l.c.* (1888) (common in Japan).
Hyloicus pinastri, id., *l.c.* (1898) (partim ; various parts of Jap., vii.).
Hyloicus pinastri var. *caligineus* Staudinger & Reb., *Cat. Lep.* ed. iii. p. 101. n. 736 (1901) (Japan).

♂. The sinus of the tenth sternite distinct. The upper process of the harpe (Pl. XXXVIII. f. 14) long, curving upward at end. Apical process of penis-sheath longer than in *pinastri.*

♀. Lobe in front of the vaginal orifice as well as the tubercle behind it individually variable, the lobe often slightly sinuate.

Hab. Various parts of Japan.

In the Tring Museum 11 ♂♂, 8 ♀♀ from : Gifu, July (Nawa) ; Yokohama, July, August ; Nagahama, July ; Tsuruga, July ; Hondo (Fritze).

b. H. caligineus sinicus subsp. nov. (Pl. XII. f. 7, ♂).

♂♀. Paler than the preceding, body as well as wings ; the brown border of the mesothoracic tegulae faint, in ♀ barely indicated ; the discal streaks of the forewing absent, or faintly marked. Scaling of antennae greyish white, with a few brown scales on the middle segments. The insect resembling in the grey colour more small pale specimens of *pinastri* than *calig. caligineus* ; stalk of SC^2 and R^1 of hindwing shorter than in *calig. caligineus*.

♂. Tenth sternite less obviously sinuate than in the preceding race, the lobes therefore much shorter. Clasper more rounded apically, shorter ; the processes of the harpe (Pl. XXXVIII. f. 13) shorter, the upper one not curved upwards at end, the lower one much narrower. Apical lobe of penis-sheath very much shorter than even in *pinastri pinastri*, agreeing in length nearly with *H. oberthueri*.

♀. Lobe of vaginal plate more deeply sinuate than in any of the specimens dissected of *calig. caligineus*.

Hab. China.

1 ♂, 1 ♀ in coll. Charles Oberthür from Zocé (Baumert) ; *type* ♂. 1 ♂, 2 ♀♀ from Shanghai in coll. Joannis. 1 ♀ in the Tring Museum received from Mons. l'Abbé de Joannis.

118. **Hyloicus oberthueri** sp. nov. (Pl. XIII. f. 10, ♂).

♂. In colour closely agreeing with *H. caligineus caligineus*, but the fringe as sharply marked white and brown as in *H. pinastri* ; the underside of the body paler grey and the narrow side-bands of the abdomen white. Legs as in *caligineus*, tibiae almost without spines ; spurs short, the long apical one of hindtibia about one-third the length of the first tarsal segment ; this about as long as the four others together. Stalk of SC^2 and R^1 of hindwing half as long as D^2. Forewing much more elongate than in any of the allied species.

♂. Tenth abdominal tergite elongate, slenderer than in *caligineus*, slightly dilated before end, with the edge somewhat notched, shortly hooked at end (Pl. XXVII. f. 4, ventral view ; f. 5, side-view), underside deeply hollowed out ; sternite longer than in the allied species, sinuate, the two lobes slender, subconical, somewhat curved dorsad at end. Clasper similar to that of *caligineus*, more rounded than in *pinastri* ; harpe (Pl. XXXVIII. f. 15) very characteristic, with two short distal processes, separated by a rounded sinus, the upper process with one or more marginal teeth, the lower one subconical, pointed, slightly curved, narrower and shorter than the upper. Penis-sheath produced into a short process which is rounded at end and scarcely curved (Pl. XXVIII. f. 48).

♀ and early stages not known.

Hab. China.

In coll. Charles Oberthür 5 ♂♂ from Tsé-kou (Dubernard), one of which was given to the Tring Museum, and is here figured.

XXXV. LAPARA.—Typus : *bombycoides*.

Sphinx, Abbot & Smith (*non* Linné, 1758), *Lep. Georgia* i. p. 83 (1797).
Hyloicus Hübner, *Verz. bek. Schm.* p. 138 (1822) (partim ; type : *pinastri*).
Anceryx Walker, *List Lep. Ins. B.M.* viii. p. 224 (1856) (partim ; type : *pinastri*).
Lapara id., *l.c.* viii. p. 232 (1856) (type : *bombycoides*).
Ellema Clemens, *Journ. Ac. Nat. Sci. Philad.* iv. p. 187 (1859) (type : *harrisi=bombycoides*).
Exedrium Grote, *New Check List* p. 11 (1882) (nom. indescr. !) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 152. 211 (1888) (short descr. ; type : *halicarniae*).

The difference between this genus and *Hyloicus* is very slight in the imago-state, the tongue and palpus being shorter resp. smaller than in the most reduced species of *Hyloicus*. The larva and pupa differ, however, essentially.

♂ ♀. Antenna about two-fifths (♂) or three-eighths (♀) the length of the forewing, thickest near base in ♂, distinctly incrassate distally in ♀. Spines of legs not prominent ; foretibia with a few apical and lateral spines, one apical spine somewhat prolonged, midtibia with dispersed spines ; spurs short, long mesotibial one about one-third the length of the first tarsal segment ; mesotarsus *without* comb ; the first segment of the tarsi as long (or nearly) as the four other segments together ; paronychium very small, *without* lobes.

♂. Sexual armature somewhat variable individually. Tenth tergite (Pl. XXVIII. f. 28) slender, curved, pointed ; sternite elongate, rounded at end, somewhat triangular. Clasper sole-shaped ; harpe (Pl. XXXIX. f. 12. 13) ending in a single process, which is somewhat curved away from the plane of the clasper, its upper margin is dentate distally and is continuous with the broad subdorsal fold of the clasper. Penis-funnel with a three-sided, pyramidal, solid process ventrally (Pl. XXXIX. f. 12. 13), the sides of which are more or less concave, while the edges are sharp ; penis-sheath (Pl. XXVIII. f. 51) ending in a triangular, pointed, slightly curved, flat, proximally concave, process.

♀. Vaginal plate rounded distally, flat, the sides slightly incrassate ; mouth of vagina proximal.

Larva with longitudinal markings, head triangular (except in first stage) ; no horn.—Food : *Coniferae*.

Sheath of tongue of pupa not free, reaching end of wing-cases.

Hab. Nearctic Region.

Four species, of which two (*halicarniae* and *pineum*) require closer examination.

a. Proportion between width and length of forewing about 42 : 100 . . . . . *b*.
Forewing proportionally much broader . 122. *L. halicarniae*.

b. Forewing scarcely with traces of markings ; without discal streaks . . . . . 120. *L. pineum*.
Forewing with transverse lines, sharply marked, mesothoracic tegula whitish at end . 121. *L. bombycoides*.
Forewing with transverse lines, less strongly marked, mesothoracic tegula not whitish at end . . . . . 119. *L. coniferarum*.

119. Lapara coniferarum.

Sphinx coniferarum Abbot & Smith, *Lep. Georgia* i. p. 83. t. 42 (*l. p. i.*) (1797) ; Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 297. n. 10 (1839) (partim) ; Westw., *Intr. Mod. Class. Ins.* ii. p. 367 (1840) ; Fitch, *Rept. Ins. N.Y.* iv. p. 742 (1858) ; Clem., *Journ. Ac. Nat. Sci. Philad.* iv.

p. 174. n. 72 (1859) (Georgia ; Canada) ; Morr., *Cat. Lep. N. Am.* p. 18 (1860) (partim) ; Clem., in Morris, *Syn. N. Am. Lep.* p. 199. n. 72 (1862) ; Harris, ed. Flint, *Ins. Inj. Veg.* p. 328 (1862) (partim) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 105. n. 44 (1875) (larva ; Georgia) ; Streck., *Lep. Rhop. Het.* p. 93 (1875) (Baltimore ; N. York) ; id., *l.c.* p. 116. t. 13. f. 15 (♂) (1876) ; Koeb., *Bull. Ent. Soc. Brooklyn* iv. p. 20 (1881) (egg, larva).

Sphinx cana Martyn, *Psyche* t. 19. f. 46 (1797).

Hyloicus coniferarum, Hübner, *Verz. bek. Schm.* p. 139. n. 1484 (1822) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 166. n. 101 (1865) (Georgia) ; Grote, *Trans. Amer. Ent. Soc.* ii. p. 115 (1870) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 642 (1877) (=*cana* Martyn, *Psyche*).

Anceryx coniferarum, Walker, *l.c.* p. 224. n. 2 (1856) (pt. ; Georgia).

Ellema coniferarum, Grote. *Bull. Buffalo Soc. N. Sci.* i. p. 27 (1874) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 625. n. 1 (1877) ; Grote, *l.c.* iii. p. 225. n. 76 (1877) (Maryld. ; S. States) ; Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 105 (1880) (♂) ; Pack., *Ins. Inj. Forest Trees* p. 768. n. 88 (1881) (cit. tab. xxxiv. ex err.) ; Grote, *New Check List* p. 11 (1882) ; Fern., *Sphing. N. Engl.* p. 85. n. 42 (1886) (egg, larva) ; Grote, *Hawk-Moths N. Am.* p. 42 (1886) ; Edw., *Ent. Amer.* iii. p. 166 (1887) (pupa, Florida) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 210 (1888) (syn. partim ; Canada to Florida) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 49 (1889) (lit. rel. to metam.) ; Kirby, *Cat. Lep. Het.* i. p. 696. n. 1 (1892) (Georgia).

Lapara coniferarum, Grote, *Bull. Buffalo Soc. N. Sci.* ii. p. 228. n. 72 (1875) (S. States) ; Bentenm., *Bull. Amer. Mus. N. H.* vii. p. 310. t. 7. f. 1 (1895) (N. York, rare ; larva, pupa).

♂♀. Variable in the distinctness of the markings of the forewing, and in size. The transverse lines disappear sometimes, the discal streaks become faint in many specimens and the second is often absent.

♂. The harpe (Pl. XXXIX. f. 12) is acuminate, or dentate, at end ; its ventral edge is either entire, as in figure, or bears a more or less distinct triangular projection in middle ; the tenth sternite is variable in width. Tenth segment see Pl. XXVIII. f. 20.

Larva green, with three white vittae, or chequered with light and dark grey oblong spots.—Food : *Pinus palustris* and other species of *Pinus*.

Hab. Canada to Florida, westward to the Mississippi basin.

In the Tring Museum 6 ♂♂, 6 ♀♀ from : N. Jersey, August ; Georgia ; Sanford, Florida, June.

120. Lapara pineum.

Ellema pineum Lintner, *Ent. Contr.* i. p. 169. t. 8. f. 12 (♂). 13 (♀) (1872) (N. York) ; id., *l.c.* p. 192 (1872) (larva on pine ; imago September) ; Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 27 (1874) (N. York) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 626. n. 3 (1877) (Canada ! ex err.) ; Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 105 (1880) ; Pack., *Ins. Inj. Forest Trees* p. 770. n. 90, f. 266. a (♂). b (♀) (1881) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 209 (1888) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 49 (1889) (lit. rel. to metam.) ; Kirby, *Cat. Lep. Het.* i. p. 696. n. 3 (1892).

Sphinx pinea (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 107. n. 46 (1875).

Lapara pinea, Grote, *Bull. Buffalo Soc. N. Sci.* ii. p. 228. n. 74 (1875) (N. York).

♂♀. Only two specimens are known ; they differ from *coniferarum* and *bombycoides* in the forewing being devoid of the discal streaks and of distinct transverse lines.

Lintner compares the larva and imago only with *bombycoides* (= *harrisi*). In our opinion, *pineum* is nothing else but an extreme aberration of the variable *coniferarum*. The two specimens should be re-examined.

Hab. State of New York.

Not seen.

121. Lapara bombycoides.

Sphinx coniferarum, Harris (*non* Abb. & Smith, 1797), in Sillim., *Journ. Sci. Art* xxxvi. p. 297. n. 10 (1839) (partim ; imago) ; Morris, *Cat. Lep. N. Am.* p. 18 (1860) (partim) ; Harris, ed. Flint, *Ins. Inj. Veg.* p. 328 (1862) (partim).

**Lapara bombycoides* Walker, *List Lep. Ins. B. M.* viii. p. 233. n. (1856) (Canada ;—Mus. Oxford) ; Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 187. n. 93 (1859) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 166. n. 103 (1865) ; Grote, *Trans. Amer. Ent. Soc.* ii. p. 115 (1868) ; id., *Bull. Buff. Soc. N. Sci.* i. p. 28 (1874) (= ?*harrisi*) ; id., *l.c.* ii. p. 228. n. 73 (1875) (=*harrisi* ; Canada, Mass., N.Y.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 626 (1877) (Canada) ; Kirby, *Cat. Lep. Het.* i. p. 695. n. 1 (1892) ; Schans, *Ent. News* vi. p. 144 (1895) (=*harrisi*).

Ellema harrisi Clemens, *Jour. Ac. Nat. Sc. Philad.* iv. p. 188. n. 94 (1859) (Maine ; N. Jersey ; N. Hampsb. ; N. Carolina) ; Morris, *Cat. Lep. N. Am.* p. 20 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 216. n. 1 (1862) ; Lint., *Proc. Ent. Soc. Philad.* iii. p. 669 (1864) (larva, pupa ; on *Pinus strobus*) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 166. n. 102 (1865) ; Betb., *Canad. Ent.* i. p. 18. n. 23 (1868) (Ontario) ; Pack., *Guide Study Ins.* p. 272 (1869) (descr. larva) ; Bowl., *Canad. Ent.* iii. p. 143 (1871) (Quebec, vii. vii.) ; Lintn., *Ent. Contr.* i. p. 170. t. 8. f. 8 (*l.*). 9 (*p.*). 10 (♂). 11 (♀) (1872) ; id., *l.c.* p. 192 (1872) (end of vi.) ; Thaxt., *Psyche* i. p. 30 (1874) (Mass., M. vi.—M. vii.) ; Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 27 (1874); Butl., *Trans. Zool. Soc. Lond.* ix. p. 626. n. 2 (1877) ; Andrews, *Psyche* ii. p. 79 (1877) (descr. of larva) ; Mart., *Trans. Dept. Agr. Illin.* xviii. App. p. 105 (1880) (larva) ; Pack., *Ins. Inj. Forest Trees* p. 768. n. 89. f. 264 a (♂). b (♀). 265 a (*l.*). b (*p.*). t. 34. f. 1. a—j (larva, details) (1881) ; Reed, *Rept. Ent. Soc. Ontario* xii. p. 70 (1882) (larva) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 207 (1888) (Canada to Florida, westw. to Mississippi) ; Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N. York, at electr. light) ; Kirby, *Cat. Lep. Het.* i. p. 696. n. 2 (1892) ; Cross, *Ent. News* vii. p. 297 (1896) (N. Hampsb.).

Eilema (!) *harrisi*, Walker, *List Lep. Ins. B.M.* xxxvi. p. 297 (1866).

Hyloicus harrisi, Grote, *Trans. Amer. Ent. Soc.* ii. p. 115 (1870) ; Butl., *l.c.* ix. p. 642 (1877).

Sphinx harrisi, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 106. n. 45 (1875) (N. York) ; Streck., *Lep. Rhop. Het.* p. 117. t. 13. f. 16 (♀) (1876) (N. Engl., Atlantic Sts.).

Lipara (!) *bombycoides*, Strecker, *l.c.* p. 127. t. 14. f. 4 (1877).

Ellema bombycoides, Fernald, *Sphing. N. Engl.* p. 83 sub n. 41 (1886) (descr. of larva, pupa ; *Pinus strobus*) ; Smith, *l.c.* xv. p. 208 (1888) (=?*harrisi*) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 49 (1889) (lit. rel. to metam.).

Ellema bombycoides var. *harrisi*, Fernald, *l.c.* p. 83 (1886).

Lapara bombycoides var. *harrisi*, Bentenmüller, *Bull. Amer. Mus. N. H.* vii. p. 310. t. 7. f. 2 (1895) (N. York, rare ; larva, pupa).

♂ ♀. A comparison at Oxford of the type of *bombycoides* with specimens of *harrisi* proved the two insects to be the same. The species is rather variable. It is of the size of small specimens of *coniferarum* ; the forewing is darker brown than in *coniferarum*, the antemedian lines are more distinct, the discal ones much more heavily dentate. The first segment of the hindtarsus is a little shorter than the other four together. The harpe is slightly broader than in *coniferarum*, but not conspicuously different. Tenth sternite see Pl. XXVIII. f. 21.

In one of our two individuals from Florida the bands of the forewing are very clearly defined and heavy, and the harpe (Pl. XXXIX. f. 13) is broader than in the New England specimens dissected, and heavily angulate ventrally. The second specimen does not show these characters so markedly.

Larva with a red face.—Foodplants : *Pinus strobus* and other pines.

Hab. Canada to Florida, westward to the Mississippi basin.

In the Tring Museum 1 larva, 1 pupa, and 9 ♂♂, 2 ♀♀ from : Maine ; Massachusetts ; New Hampshire ; Florida.

122. Lapara halicarniae.

Sphinx halicarniae Strecker, *Bull. Brooklyn Ent. Soc.* iii. p. 35. fig. (1880) (Florida).
Exedrium halicarniae, Grote, *New Check List* p. 11 (1882); Smith, *Trans. Amer. Ent. Soc.* xv. p. 211 (1888); Kirby, *Cat. Lep. Het.* i. p. 698. n. 1 (1892).

♀. Only one specimen is known. It represents possibly a separate genus, for which the name *Exedrium* (1888) as defined by Smith, *l.c.*, will have to be retained. We do not see any necessity, at present, to keep *halicarniae* generically separate. Strecker's figure is quite insufficient to base a genus upon; the specimen requires examination as to structure.

Hab. Florida, *type* in coll. Strecker.

Not seen.

XXXVI. THAMNOECHA gen. nov.—Typus: *uniformis*.

Hyloicus, Butler (*non* Hübner, 1822), *Proc. Zool. Soc. Lond.* p. 261 (1875).
Pseudosphinx, Hampson (*non* Burmeister, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 106 (1892).

♂. Antenna long (tip broken off in the three specimens seen), distinctly narrowed at the base, the segments not touching one another ventrally, middle ones feebly dilated laterad subdorsally, almost as long as high, transsection little higher than broad. Pilifer with brush of bristles. Palpus small, rough. Tongue short. Tibiae *not* spiny; spurs very short, proximal pair of hindtibia *absent*; *no* pulvillus, paronychium very small, *without* lobes; first segment of foretarsus with four long spines, the apical one nearly half the length of the segment, second segment as long as the first.

Tenth abdominal tergite (Pl. XXVI. f. 34) narrow, curved, pointed, compressed; sternite broad (Pl. XXVI. f. 35), obtuse, feebly sinuate at end. Harpe (Pl. XXV. f. 17) narrow, without patch of modified scales, subdorsal fold of inner surface high, with bristles; harpe simple, not dentate, ending in an obtuse process. Penis-sheath (Pl. XXVIII. f. 47) thin, prolonged into a flat, feebly concave process curving sideways, ending in a very short pointed hook.

♀. Unknown.

Larva and chrysalis unknown.

Hab. North-West India.

One species.

A development from the ancestor of *Hyloicus caligineus* and *oberthueri*; the complete loss of the proximal pair of spurs from the hindtibia is a noteworthy character.

123. Thamnoecha uniformis.

**Hyloicus uniformis* Butler, *l.c.* (1875) (N. W. Himal.;—Mus. Brit., ♂); id., *Trans. Zool. Soc. Lond.* ix. p. 616. n. 4 (1877).
**Pseudosphinx concolor* Hampson, *l.c.* p. 106. n. 170 (1892) (Subathu, Simla, ♂;—Mus. Brit.).
Hyloicus concolor, Kirby, Nov. Zool. i. p. 103 (1894) (Simla).

♂. Resembling in colour to a certain extent small specimens of *Hyloicus pinastri* and *caligineus*.

Hab. N. W. India.

Three ♂♂ in the British Museum.

Tribe **Sphingulicae** nov.

♂ ♀. End-segment of antenna short, not prolonged into a thin filiform process. Tongue half the length of the body, or shorter. Spinulation of abdomen weak, spines of sternites absent, or as weak as scales. No patch of friction-scales on clasper. Mesotarsus without basal comb. Paronychium with two lobes at each side, or without lobes, never with one lobe.

Hab. Oriental Region.

This small group of genera shows many affinities with the *Ambulicinae* in the imago state as well as in the larva and pupa, and takes an intermediate position between the tribe *Sphingicae* and the subfamily *Ambulicinae*. Of special interest is the peculiar development of the claw-segment in this tribe. As in the *Sphingicae*, the paronychium has in the lower genera two lobes at each side; while, however, in the *Sphingicae* the next stage in the retrogressive development of the paronychium is represented by a great number of genera with the ventral lobe aborted and the subdorsal lobe preserved, no such stage is found in the *Sphingulicae*, where both lobes disappear at the same time, as exemplified by *Sphingulus*. Another remarkable fact is illustrated by this latter genus. Among the *Sphingicae* the *pulvillus* disappears always *before* the lobes of the paronychium; there is no species of *Sphingicae* which has a pulvillus and is devoid of a paronychial lobe. In *Sphingulus*, however, the paronychial lobes become obliterated, *before* the pulvillus shows any sign of reduction.* That is to say, we find exactly the opposite line of development in the two tribes. If this holds good for all the *Sphingulicae*, as we believe it does, then *Dolbinopsis* and *Hopliocnema*, which are both without pulvillus and paronychial lobes, have first lost the paronychial lobes and then the pulvillus. The intermediate stage between *Synoecha* and *Hopliocnema*, and between *Dolbina* and *Dolbinopsis*, had pulvilli but no paronychial lobes. Such a stage, corresponding to *Sphingulus*, is not known, or, we are inclined to say, not yet known.

In the diagram inserted opposite, the genera are tabulated according to the relationship. It will be noticed that the whole tribe is divided into one group of genera with the fore- and midtibiae spinose, and another group with the tibiae not spinose. The latter group consists of two branches, of which the two more generalised genera *Dolbina* and *Kentochrysalis* are very closely allied, while the specialised genera *Sphingulus* and *Dolbinopsis*, which head the two branches, are widely different from one another. *Dolbinopsis*, though clearly a derivation from *Dolbina*, agrees in several characters with the most specialised genus *Hopliocnema* of the branch with spinose tibiae, namely in negative characters which are the outcome of the retrogressive development so often referred to among the *Sphinginae* and *Ambulicinae*. Both *Dolbinopsis* and *Hopliocnema* are devoid of pulvilli and paronychial lobes, and have the foretibia armed with a thorn (not a spine). This similarity is the result of parallel development, and does not at all indicate close relationship. Further, we find the bristles of the pilifer in a normal state in *Tetrachroa* and *Synoecha*, while they are reduced in number or developed to hair-scales in *Hopliocnema* and all the genera of the branch with non-spinose tibiae. We meet with the same peculiar modification also among the *Ambulicinae*. This again does not mean closer relationship between the genera with scaled pilifer.

The larva and pupa, so far as known, agree in many respects with those of the typical *Ambulicinae*.

* The same is the case in some *Ambulicinae*.

HOPLIOCNEMA.
Tongue short, weak.
Pilifer with scales.
Antenna of ♀ andromorphic.
Foretibia with apical thorn.
Fore-midtibiae spinose.
Spurs short.
Pulvillus absent.
Paronychium absent.

SYNOECHA.
Tongue short, weak.
Pilifer with bristles.
Antenna of ♀ andromorphic.
Foretibia with apical thorn.
Fore-midtibiae spinose.
Spurs reduced in length.
Pulvillus present.
Paronychium with two lobes.

TETRACHROA.
Tongue short, half the length of the body.
Pilifer with bristles.
Antenna of ♀ cylindrical, not andromorphic.
Foretibia with apical thorn.
Fore-midtibiae spinose.
Spurs long.
Pulvillus present.
Paronychium with two lobes.

DOLBINOPSIS.
Tongue short, weak.
Pilifer with few bristles.
(Antenna of ♀ not known).
Foretibia with apical thorn.
Fore-midtibiae not spinose.
Spurs short.
Pulvillus absent.
Paronychium absent.

DOLBINA.
Tongue short, weak.
Pilifer with few bristles, or with scales.
Antenna of ♀ andromorphic, segments not laterally dilated either in ♂ or ♀.
Foretibia simple.
Fore-midtibiae not spinose.
Spurs short.
Pulvillus present.
Paronychium with two lobes.

SPHINGULUS.
Tongue short, weak.
Pilifer with scales.
Antenna of ♀ andromorphic, segments laterally dilated in ♂, less so in ♀.
Foretibia simple.
Fore-midtibiae not spinose.
Spurs short.
Pulvillus present.
Paronychium absent.

KENTOCHRYSALIS.
Tongue short, weak.
Pilifer with scales.
Antennae of ♀ andromorphic, segments laterally dilated in ♀ and ♂.
Foretibia simple.
Fore-midtibiae not spinose.
Spurs short.
Pulvillus present.
Paronychium with two lobes.

(NOT KNOWN.)
Tongue short, weak.
Pilifer with bristles.
Antenna of ♀ andromorphic, segments not laterally dilated in ♂ and ♀.
Foretibia simple.
Fore-midtibiae not spinose.
Spurs short.
Pulvillus present.
Paronychium with two lobes.

(ANCESTRAL GENUS, NOT KNOWN.)
Tongue long, stout.
Pilifer with a comb of bristles.
Antenna of ♀ cylindrical, without fasciculated ciliae.
Foretibia simple.
Fore-midtibiae not spinose.
Spurs long.
Pulvillus present.
Paronychium with two lobes on each side.

SPHINGULICAE. SPHINGICAE. ACHERONTHCAE.

ACHERONTHINAE.

Key to the genera :

a.	Fore- and midtibiae spinose	*b*.
	„ „ „ not spinose . . .	*d*.
b.	Pulvillus absent	XXXIX. *Hopliocnema*.
	„ present	*c*.
c.	Spurs short, tongue short and weak, hindwing grey	XXXVIII. *Synoecha*.
	Spurs long, tongue half the length of the body, hindwing rufous .	XXXVII. *Tetrachroa*.
d.	Foretibia armed with an apical thorn ; no pulvillus . . .	XL. *Dolbinopsis*.
	Foretibia without an apical thorn ; pulvillus present . . .	*e*.
e.	No paronychial lobes . . .	XLIII. *Sphingluus*.
	With two paronychial lobes at each side	*f*.
f.	Antennal segments distinctly dilated laterally in dorsal view . .	XLII. *Kentochrysalis*.
	Antennal segments not dilated laterally in dorsal view . . .	XLI. *Dolbina*.

XXXVII. TETRACHROA gen. nov.—Typus : *edwardsi*.

Macrosila, Olliff (*non* Walker, 1856), *Proc. Linn. Soc. N. S. Wales* (2). v. p. 515 (1890).
Meganoton, Kirby (*non* Boisduval, 1875), *Cat. Lep. Het.* i. p. 683 (1892).

♂♀. Tongue about half the length of the body, rather stout proximally, thin distally. Pilifer with normal brush of bristles ; genal process triangular, as long as the pilifer. Palpus elongate, projecting a little beyond frons in a dorsal aspect. Antenna with end-segment about four times as long as basally high, clothed with broad scales ; ♂ : not strongly compressed, fasciculated ciliae about half as long as the segments broad dorsally ; ♀ : cylindrical, ciliae all very short. Fore- and midtibiae spinose ; foretibia ending in a long thorn, with some heavy terminal spines, shorter (thorn excluded) than first tarsal segment ; spurs of mid- and hindtibiae *long*, long terminal one of hindtibiae about four-fifths the length of the first tarsal segment ; midtarsus without comb ; hindtarsus half as long again as the cell of the hindwing, first segment much longer than 2 to 5 together ; pulvillus *present*, paronychium with *two* slender lobes at each side. Spines on abdominal sternites very weak.

♂. Tenth abdominal tergite elongate, divided at end into two short triangular lobes, which are turned downward. Clasper without patch of modified scales ; subdorsal fold very high, running ventrad at end, armed with spines (Pl. XXXIX. f. 14) ; harpe elongate-triangular, densely covered with erect scales, dorso-basal margin raised to a high ridge. Tenth sternite and penis-sheath not preserved in our ♂ specimen ; clasper dorsally also damaged, the fold apparently with spines all along the edge.

♀. Postvaginal part of vaginal plate membranaceous, short, scaled, antevaginal part rather strongly chitinised, proximal edge of vaginal cavity convex, incrassate.

Early stages not known.

Hab. Australia.

One species.

124. Tetrachroa edwardsi.

Macrosila edwardsi Olliff, *l.c.* (1890) (Brisbane; Lower Hunter R., N.S.W.); Misk., *Proc. Roy. Soc. Queensld.* viii. p. 26. n. 43 (1891).

Meganoton edwardsi, *Kirby*, *l.c.* n. 18 (1892).

**Meganoton variegatum* Rothschild, *Iris* vii. p. 301. n. 13. t. 6. f. 1 (1894) (Queensland;—coll. Staudinger).

♂♀. Easily recognised by the rufous-red hindwings, which are marked with black, yellow and white in the basi-abdominal region.

Hab. Queensland and N.S. Wales.

In the Tring Museum 1 ♂, 2 ♀♀ from Dawson district and Brisbane district, Queensland.

XXXVIII. SYNOECHA gen. nov.—Typus: *marmorata*.

Sphinx, Lucas, *Proc. Linn. Soc. N. S. Wales* (2.) vi. p. 278 (1891).

♂. Not known.

♀. Pilifer with bristles; genal process short, obtuse. Palpus very small, inner surface covered with large scales, first segment shorter than second. Tongue short and weak. Antenna thin, filiform, slightly prismatical, with distinctly fasciculated ciliae, feebly constricted at the joints, end-segment short. Fore- and midtibiae spiny; foretibia with long apical thorn, shorter (excl. of thorn) than first tarsal segment; spurs longer than in *Hopliocnema* and *Dolbinopsis*; pulvillus and paronychium *present*, the ventral lobes of the paronychium rather short. SC^2 and R^1 of hindwing on a long stalk.

♀. Vaginal plate much wrinkled transversely; vagina a rather strongly chitinised cylinder, ending beyond the middle of the vaginal plate, the edge of its mouth incrassate, forming a halfring, without processes.

Larva tapering in front, head narrowed above, horn straight; green, two thin interrupted lines on back and a broader line at each side, dilated ventrad a little on the abdominal segments, white.—Food-plant: *Eremophila mitchelli*.

Chrysalis not known.

Hab. Queensland.

125. Synoecha marmorata (Pl. XII. f. 10, ♀).

**Sphinx marmorata* Lucas, *l.c.* (1891) (—coll. Barnard, now in Mus. Tring).

Phlegethontius (?) *marmorata*, Kirby, Nov. Zool. i. p. 38. n. 44 (1894).

♀. Abdominal tergite 1 to 5 with a white mesial spot at apex and a large, oval, creamy white patch at the side, by which the species can easily be recognised The spines of the foretibia not numerous, but the externo-lateral ones heavy.

Hab. Queensland, Dawson district.

Only one specimen known, now in the Tring Museum, from the Barnard collection; it is a ♀, and was bred at Coomooboolaroo, Duaringa, Dawson R., on 27. xii. 1884; we have a coloured figure of the larva drawn by Miss Barnard.

XXXIX. HOPLIOCNEMA gen. nov.—Typus : *melanoleuca*.

♂ ♀. Differs from *Dolbinopsis* (♂) as follows : body slenderer ; antenna little less than half the length of the forewing, of even width from near base to near end, hook scarcely indicated ; pilifer with brush of *bristles* and a very few *scales* ; legs roughly scaled ; foretibia with some spines at end, besides the apical thorn ; midtibia spinose ; SC^2 and R^1 of hindwing stalked, R^2 from before centre of cell, D^3 twice as long as D^1.

♂ Tenth tergite divided at end, narrow ; sternite elongate, simple.

♀. Antenna andromorphic, the segments impressed laterally, with the basal and apical ciliae not so long as in ♂.

Early stages not known.

Hab. West Australia.

One species.

126. **Hopliocnema melanoleuca** spec. nov (Pl. XII. f. 6, ♂).

♂ ♀. Body dark smoky grey ; head and thorax unicolorous ; abdomen with a series of transverse white spots on each side, underside somewhat paler than upperside ; scaling of antenna white. Here and there a shade of pink, especially in the ♀.

Wings *above*.——Forewing like thorax, with two pairs of transverse black lines, the proximal pair in basal half, the other on the disc : first line strongly curved costad, forming nearly a right angle in cell, second at right angles to costa, forming an obtuse angle just behind cell, third and fourth slightly convex in middle and concave behind ; stigma greyish white, encircled with black ; fringe with greyish white ill-defined spots.——Hindwing dirty white, with or without a trace of a discal line, fringe a little darker than wing, with minute black nerve-dots.

Underside.——Forewing densely shaded with greyish white scaling ; two discal lines vestigial.——Hindwing as above, but with two vestigial brown lines, best marked at costal margin, which is more or less brown : the first line at or just beyond end of cell, the second a little nearer outer margin at R^3 than cell ; here and there some brown scales, which are more numerous in ♀.

♂. Tenth abdominal tergite rather flat, convex at end, narrow, the apex divided into two triangular lobes which are turned downward ; sternite flat, narrowed to end, which is rounded (Pl. XXVII. f. 8). Clasper sole-shaped ; harpe with a simple, concave, slightly spoon-shaped and a little curved, obtuse process (Pl. XXXV. f. 22). Penis-sheath ending in a short, obliquely truncate, pointed process (Pl. XXIX. f. 20).

♀. Vaginal plate without special armature, postvaginal part membranaceous, except a narrow transverse belt of chitin ; antevaginal part more strongly chitinised, with a proximal transverse fold ; anterior edge of vaginal cavity slightly raised, semicircular.

Larva and chrysalis not known.

Length of forewing : ♂ ♀, 17 to 19 mm.

Hab. West Australia.

In the Tring Museum 3 ♂♂, 1 ♀ from : Roebourne (*type*, ♂) ; Sherlock R. (Dr. Clements).

XL. DOLBINOPSIS gen. nov.—Typus : *grisea*.

Pseudosphinx, Hampson (*non* Burmeister, 1856), in Blanf., *Fauna Brit. Ind.*, *Moths* i. p. 104 (1892).
Hyloicus, Kirby (*non* Hübner, 1822), Nov. Zool. i. p. 39 (1894).

♂. Allied to *Dolbina*, of which it is a development. Palpus small. Pilifer with a few bristles as in *D. inexacta*. Antennal segments not quite touching one another ventrally, penultimate segment longer than high. Foretibia ending in a naked *thorn ; no* pulvillus, paronychium scarcely indicated ; first segment of foretarsus longer than tibia (thorn excluded), shorter than segments 2 to 5 together ; tibiae rather smoothly scaled ; midtibia much longer than first tarsal segment ; spurs very short, two pairs to hindtibia, the proximal pair almost concealed under the scaling. SC^2 and R^1 of hindwing separate ; R^2 from centre of cell. Sexual armature of the *Dolbina* type.

♀. Unknown.

Larva and chrysalis unknown.

Hab. N.W. India.

One species.

The presence of the thorn on the foretibia and the absence of the pulvillus and the paronychial lobes are the outcome of that kind of development accompanied by reduction which we find so often among the *Sphingicae*.

127. Dolbinopsis grisea.

**Pseudosphinx grisea* Hampson, *l.c.* i. p. 104. n. 165 (1892) (Kulu ;—Mus. Brit.).
Hyloicus grisea, Kirby, *Cat. Lep. Het.* i. p. 39. n. 7 a (1892).

♂. Resembles in pattern the species of *Dolbina*. Tenth abdominal tergite (Pl. XXVII. f. 6) broad, obtusely triangular, curved downward distally, more suddenly narrowed from the point of curvature to the end ; sternite (Pl. XXVII. f. 7) with a divided lobe, the two halves slender. Clasper without patch of modified scales, broadly rounded, broadest beyond middle (Pl. XXXIX. f. 19) ; harpe with a finger-like ventro-distal process, and two dorsal processes, of which the proximal one is the narrower. Penis-funnel obliquely truncate ; penis-sheath (Pl. XXVIII. f. 39) armed with a horizontal tooth pointing sinistro-laterad ; on the inner side of the sheath opposite the tooth there is a patch of spines, which are visible from the outer side as fine dots.

♀. Unknown.

Hab. Kulu, N.W. India.

One ♂ in the British Museum.

XLI. DOLBINA.—Typus : *tancrei*.

Macrosila Walker, *List Lep. Ins. B. M.* viii. p. 208 (1856) (partim).
Sphinx, Boisduval (*non* Linné, 1758), *Spec. Gén. Lép. Hét.* i. p. 117 (1875).
Pseudosphinx, Butler (*non* Burmeister, 1856), *Trans. Zool. Soc. Lond.* ix. p. 611 (1877).
Dolbina Staudinger, in Rom., *Mém. Lép.* iii. p. 155 (1887) (type : *tancrei*).
Hyloicus, Kirby (*non* Hubner, 1822), *Cat. Lep. Het.* i. p. 694 (1892).
Meganoton, Rothschild (*non* Boisduval, 1875), Nov. Zool. i. p. 90 (1894)

♂♀. Differs from *Sphingulus* and *Kentochrysalis* in the much more robust thorax and abdomen, in the stronger spinulation of the latter, the presence of weak

spines also on the sternites, the less slender antennae, the segments of which are not rounded-dilated laterad and have longer ciliae ventrally in the proximal series.—Antenna of ♂ rather thick in basal fourth.

♂. Tenth abdominal tergite broad and short, triangularly narrowed at end, minutely sinuate, upperside scaled mesially; sternite with two short, straight processes. Penis-sheath armed with an apical tooth curving sinistro-laterad. No patch of modified scales on clasper; the latter small, very strong ventro-basally; harpe large, with broad ventro-distal process and three rounded dorsal lobes.

♀. Vaginal plate feebly chitinised, except at the large vaginal cavity; the edge of this cavity armed with two processes.

Larva not described; said to be nearly the same as that of *Sphinx ocellata*.

Hab. N. India to Amurland and Japan.

The three species resemble in colour the Nearctic *Dolba*, with which they are, however, not nearly related.

Staudinger, when describing the genus *Dolbina*, said that the tongue was not longitudinally grooved and that the hindtibia had only *one* spur. In this he was wrong. There is no Lepidopterous insect to our knowledge which has only one spur to the hindtibia: if the terminal pair becomes reduced both spurs disappear. *Dolbina* has, as a matter of fact, *two pairs* of spurs to the hindtibia; but the spurs are short, and therefore easily overlooked by a casual observer. The longitudinal groove of the tongue, *i.e.* the groove at each side of the mesial fringe of ciliae which keep the two maxillae together, is not so obvious in *Dolbina* and other genera with reduced tongues as in the genera with long probosces, but is nevertheless present in *Dolbina* (as it is in all genera). Bartel, in Rühl, *Grossschm.* ii. p. 26, repeats those erroneous statements.

Key to the species:

a. Abdomen beneath with large black mesial patches . . . . . *b*.
Abdomen beneath without large black mesial patches . . . . . 130. *D. exacta*.
b. Pilifer with a few bristles only . . . 128. *D. inexacta*.
„ „ long white hair-scales . . 129. *D. tancrei*.

128. Dolbina inexacta.

**Macrosila inexacta* Walker, *List Lep. Ins. B. M.* viii. p. 208. n. 14 (1856) (N. India;—Mus. Brit.).
Sphinx inexacta, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 117. n. 59 (1875).
Pseudosphinx inexacta, Butler, *Trans. Zool. Soc. Lond.* ix. p. 611. n. 6 (1877) (N. India; Masuri); id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 16. t. 81. f. 8 (1881); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 104. n. 164 (1892) (Mussoorie; Khasis; Bombay).
Hyloicus inexacta, Kirby, *Cat. Lep. Het.* i. p. 694. n. 7 (1892).
**Meganoton khasianum* Rothschild, Nov. Zool. I. p. 90 (1894) (Khasia Hills;—Mus. Tring); Hamps., *l.c.* iv. p. 453 (1896) (=*discistriga* ex err. !!).

♂♀ Pilifer with a *few bristles*, no scales. Distal margin of forewing almost straight in ♂ somewhat sinuate before hinder angle, discal interspace sometimes pinkish grey between cell and posterior margin; abdomen with very large black mesial patches beneath; legs and breast of the mummy-brown colour of the underside of the wings, contrasting strongly with the almost white scaling in the middle of meso- and metasternum and at the edges of the abdominal sternites; the greyish white tips of the tarsal segments and the tibiae also conspicuous.

♂. Tenth abdominal tergite flat, curved, short, mesially membranaceous to near

the end, dilated before the end, then triangularly narrowed, shorter than in the following species. Lobes of sternite farther apart than in the other species, shorter and more oblique. Ventral process of harpe (Pl. XXXIX. f. 20) dorsally rounded-sinuate, the tip blunt; dorsal process divided into a rounded, single, basal lobe, and double distal lobe. Hook of penis-sheath (Pl. XXIX. f. 35) long; inner side of sheath with small apical patch of spines ventrally.

♀. The triangular lobes at the edge of the vaginal cavity stand in front of the cavity; they are triangular and about as long as the sinus between them is broad (Pl. XXII. f. 1).

Larva and pupa not known.

Hab. India: N.-W. India to Assam and Bombay; Central India (probably also to be found in Burma and Tonkin).

In the Tring Museum 4 ♂♂, 8 ♀♀ from: Sikhim; Khasia Hills; Cherrapunji.

129. Dolbina tancrei.

**Dolbina tancrei* Staudinger, in Rom., *Mém. Lép.* iii. p. 155. t. 17. f. 8 (1887) (partim; Amur;—coll. Staudinger); id., *l.c.* vi. p. 221. n. 210 (1892) (Amur); Kirby, *Cat. Lep. Het.* i. p. 685. n. 1 (1892); Leech, *Trans. Ent. Soc. Lond.* p. 289. n. 68 (1898) (Hakodate, viii.); Bartel, in Rühl, *Grossschm.* ii. p. 28 (1899) (Amur); Staud. & Reb., *Cat. Lep.* ed. iii. p. 101. n. 739 (1901) (Amur; Ussuri; Japan).

Pseudosphinx inexacta, Leech (*non* Walker, 1856), *Proc. Zool. Soc. Lond.* 588. n. 31 (1888) (partim; Hakodate, Yokohama).

♂♀. Pilifer with a brush of *scales* and a few bristles. The green colour of wings and body by which this species is generally said to be distinguishable from *exacta* is not a specific character; some *exacta* are much greener than certain *tancrei*. The chief difference between *exacta* and *tancrei* is the absence of the large black patches from the underside of the abdomen of *exacta*, which patches are nearly as well developed in *tancrei* as they are in *inexacta*. In the sexual armature *tancrei* stands intermediate between *exacta* and *inexacta*.

♂. Sexual armature as in *exacta*, but the two proximal lobes of the harpe farther apart (Pl. LIX. f. 5).

♀. The processes of the vaginal plate wider apart than in *inexacta* (Pl. XXI. f. 22), much less slender than in *exacta*.

Larva and chrysalis not known.

Hab. Amurland; Japan: Yesso, Nippon.

In the Tring Museum 1 ♂, 4 ♀♀ from: Sidemi, Amurland; Japan; Kawagashi, 5. vi. 1889 (Dr. Fritze, in the afternoon at a rose-bush).

130. Dolbina exacta.

Dolbina tancrei Staudinger, in Rom., *Mém. Lép.* iii. p. 155 (1887) (partim).

Dolbina inexacta, Fixsen (*non* Walker, 1856), in Rom., *Mém. Lép.* iii. p. 320. n. 94 (1887) (*Corea*, viii.); Leech, *Trans. Ent. Soc. Lond.* p. 289. n. 69 (1898) (Chang-Yang).

Pseudosphinx inexacta, Graeser, *Berl. Ent. Zeitschr.* xxxii. p. 104. n. 180 (1888) (Wladiwostock, two broods; *Fraxinus*, *Syringa*); Leech, *Proc. Zool. Soc. Lond.* p. 588. n. 31 (1888) (partim).

**Dolbina exacta* Staudinger, in Rom., *Mém. Lép.* vi. p. 222. n. 211. t. 4. f. 1 (♂) (1892;—coll. Staudinger); Kirby, Nov. Zool. i. p. 102. n. 2 (1894); Bartel, in Rühl, *Grossschm.* ii. p. 29 (1899) (Bikin; Ussuri; Wladiwostock; Corea); Staud. & Reb., *Cat. Lep.* ed. iii. p. 101. n. 740 (1901) (Ussuri; Corea).

♂♀. Pilifer with a brush of *scales* and a *few* bristles. Underside of abdomen brownish grey like the wings, the brownish black basal spots of the segments reduced, generally not visible.

♂. Tenth tergite broad, flat, curved downward, narrowed from middle to end, which is incised ; processes of sternite short and slender (Pl. XXVIII. f. 27). Ventral process of harpe (Pl. XXXIX. f. 16) suddenly narrowed at end to a point, dorsal process divided into a single distal and double proximal lobe. Tooth of penis-sheath short (Pl. XXIX. f. 34), inner surface of sheath densely covered ventrally with sharp spines, which form a patch that extends far proximad, the bases of the spines shining through the sheath as small dots ; this armature reminds one strongly of that found in *Amorpha populi*.

♀. The two processes of the vaginal plate stand at the side of the vaginal cavity, and are very slender (Pl. XXII. f. 2).

Larva said by Graeser, *l.c.*, to be very similar to, and the pupa not distinguishable from, that of *Sphinx ocellata*.—Food-plants : *Syringa* and *Fraxinus*.

Two broods.

Hab. Amurland and Japan.

In the Tring Museum 8 ♂♂, 7 ♀♀ from : Amurland ; Japan.

XLII. KENTOCHRYSALIS.—Typus : *streckeri*.

Kentochrysalis Staudinger, in Rom., *Mém. Lép.* iii. p. 157 (1887) (type : *streckeri*).
Ancerya, Leech (*non* Walker, 1856), *Proc. Zool. Soc. Lond.* p. 589 (1888).

♂♀. Head small, scaling prolonged to an interantennal tuft. Tongue very short and weak, the two halves separated distally, sometimes also proximally, the ciliae at the inner edge long and rather widely apart. Pilifer reduced to a tubercle, clothed with scales and bristles ; genal process short ; tubercle of labrum low, transverse. Palpus small, smaller in ♀ than in ♂, joint between segments 1 and 2 naked, inner surface of segment 1 scaled, except at base. Antenna : end-segment two or three times as long as high basally, triangular ; ♂ : strongly compressed, ciliae long ; ♀ : fasciculated ciliae shorter than in ♂. Tibiae not spinose ; spurs short, hindtibia with two pairs, but proximal pair often concealed under the scaling ; first tarsal segment almost exactly as long as the four other segments together, no prolonged spines ; no mesotarsal comb ; hindtarsus not longer than the cell of the hindwing ; pulvillus and paronychium present, but the paronychial lobes very slender.

♂. Harpe with a long ventro-distal process. Tenth tergite scaled mesially ; sternite with a broad mesial lobe. Penis-sheath produced into a long hook, which is curved proximad.

♀. Vaginal cavity covered by a broad lobe.

Larva granulose, head triangular.

Pupa without free tongue-sheath, armed with some high, sharp tubercles on the basal sternites of the abdomen, which serve as an organ of locomotion *

Hab. Amurland ; Mongolia ; Japan.

Three species.

It was not without hesitation that we decided to keep the seven species of *Sphingulus*, *Kentochrysalis* and *Dolbina* separate under these three generic terms. Though *Sphingulus* and *Dolbina* represent divergent branches from the same stock which are easily enough distinguishable, *Kentochrysalis* stands intermediate between

* See Appendix.

the two, and comes, in fact, in several points so near *Dolbina* that the discovery of a form connecting the two genera would be no surprise to us. *Dolbina* has nothing to do with the American *Dolba* ; the similarity is quite superficial.

Standinger says, *l.c.*, that the hindtibiae have only one pair of spurs ; in this he was wrong.

Key to the species :

a.	Antenna with large brown patch on the upperside	*b.*
	Antenna with the patch absent or only vestigial	133. *K. sieversi.*
b.	The two antemedian lines of the forewing ending at inner margin in a black patch.	132. *K. consimilis.*
	The two antemedian lines less distinct, the black patch absent	131. *K. streckeri.*

131. Kentochrysalis streckeri.

**Sphinx streckeri* Staudinger, *Ent. Nachr.* vi. p. 252 (1880, Nov.) (Wladiwostock, vi. ; Askö I. ;— coll. Staudinger).

**Sphinx daridis* Oberthür, *Et. d'Ent.* v. p. 27. n. 68. t. 7. f. 9 (1880, Dec.) (Mongolia ; Askold, V. ;— coll. Charles Oberthür).

Kentochrysalis streckeri Staudinger, in Rom., *Mém. Lép.* iii. p. 157 (1887) ; Graes., *Berl. Ent. Zeitschr.* xxxii. p. 104. n. 181 (1888) (=*daridis* ; Wladiwostock, rather common ; on *Fraxinus* and *Syringa*) ; Staud., *l.c.* vi. p. 220. n. 209 (1892) (=*daridis*) ; Kirby, *Cat. Lep. Het.* i. p. 693. n. 1 (1892) (partim) ; Leech, *Trans. Ent. Soc. Lond.* p. 290. n. 70 (1898) (partim) ; Bartel, in Rühl, *Grossschm.* ii. p. 32 (1899) (partim ; Amur, Wladiwostock, Askold, Mongolia) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 101. n. 737 (1901) (partim ; Ussuri).

Anceryx daridis, Leech, *Proc. Zool. Soc. Lond* p. 589. n. 34 (1888) (partim).

♂ ♀. Antennae of both sexes with fasciculated ciliae on all segments, the ciliae on the terminal segments long in ♂ ; segments rounded-dilated dorso-laterally in ♂ and ♀, especially the middle ones ; end-segments see Pl. LX. f. 10. Pilifer with a brush of scales and a few bristles. Palpus rough with hairs, especially the first segment.

♂. Tenth abdominal tergite triangular, about twice as long as broad basally, pointed, flat above, curved downward, prismatically compressed distally, the underside carinate (Pl. XXVIII. f. 22) ; sternite broad, short, truncate-sinuate, angles rounded. Dorso-distal margin of clasper very oblique ; harpe (Pl. XXXIX. f. 21) with a broad, almost flat, upper lobe, which is dentate and sinuate, the ventro-distal process slender, cylindrical, obtuse. Penis-funnel cylindrical, somewhat obliquely truncate ; penis-sheath ending in a long, slender, pointed hook curving proximad and sinistrad (Pl. XXIX. f. 32).

♀. Vaginal plate feebly sinuate ; the wide vaginal cavity covered proximally by a broad rounded lobe (Pl. XXI. f. 21).

Larva said to be similar to those of *Sphinx ocellata* and *Phyllosphingia dissimilis*.—Foodplants : *Syringa*, *Fraxinus*, *Ligustrum*.

Chrysalis described by Staudinger as possessing a pair of long, narrow, pointed tubercles on the first and second abdominal sternites, similar to those of *Ph. dissimilis*.*

Hab. Amurland ; Mongolia ; Askold.

In the Tring Museum 7 ♂♂, 8 ♀♀ from Amurland ; one pupa.

* See Appendix.

132. Kentochrysalis consimilis spec. nov.

Hyloicus davidis, Butler (*non* Oberthür, 1880), *Trans. Ent. Soc. Lond.* p. 2 (1881 (Tokio).
Ancerya davidis, Leech, *Proc. Zool. Soc. Lond.* p. 589 (1888) (partim).
Kentochrysalis streckeri, Kirby, *Cat. Lep. Het.* i. p. 693. n. 1 (1892) (partim); Leech, *Trans. Ent. Soc. Lond.* p. 290. n. 70 (1898) (Yokohama, on stems of yew trees).

♂. Intermediate between *streckeri* and *sieversi*, but different from both; of the size of *streckeri*, with which it has generally been confounded.

In appearance like *streckeri*, but the external discal lines of the forewing less dentate, the two antemedian lines distinct, ending at inner margin in a blackish patch which is prolonged basad.

♂. Tenth tergite (Pl. XXVIII. f. 23) suddenly narrowed to a short pointed hook; sternite (Pl. XXVIII. f. 24) divided into two triangular lobes. Clasper as in *sieversi*, broadest near base; harpe longer than the clasper (Pl. XXXIX. f. 15), not unlike that of *sieversi*, but the ventral process shorter. Besides this process there are five or six more, which vary in form and position in the specimens dissected, the most ventral one being, however, always large. Penis-sheath as in *sieversi*.

♀. Unknown.

Larva and chrysalis unknown; feeds probably on yew.

Hab. Japan.

A series of ♂♂ in the Brit. Museum from: Chinzengi, viii. 1881 (Lewis); Tokei; Nikko; one transferred (in exchange) to the Tring Museum.

133. Kentochrysalis sieversi.

Kentochrysalis sieversi Alphéraky, in Rom., *Mém. Lép.* ix. p. 164. t. 10. f. 1 (1897) (Corea); Leech, *Trans. Ent. Soc. Lond.* p. 290. n. 71 (1898) (doubts distinctness); Bartel, in Rühl, *Grossschm.* ii. p. 33 (1899); Staud. & Reb., *Cat. Lep.* ed. iii. p. 101. n. 738 (1901) (Ussuri, Corea).

♂. Antennal segments very feebly dilated laterad, fasciculated ciliae of distal segments shorter than in *streckeri*. Palpus not hairy. Pilifer with scales and some bristles. Antenna without the large black patch of *streckeri*, there being only a few brown scales present in *sieversi*. R^3 of hindwing before centre of cell, stalk of SC^2 and R^1 longer than in *streckeri*.

♂. Tenth abdominal tergite more abruptly narrowed and curved than in *streckeri*; sternite very broad, truncate, sides obtusely dentate (Pl. XXVIII. f. 25). Clasper widest near base; inner surface with long thin scales; harpe very large (Pl. XXXIX. f. 17), reaching basally close to dorsal margin and ventro-distally to the apex of the clasper, the ventral finger-like process is short; above it there is a pointed triangular process curving upwards; the dorso-basal part of the harpe is provided with large teeth. Penis-sheath similar to that of *streckeri*, the hook longer.

♀. Not seen.

Early stages not known.

Hab. Corea and Amurland.

In the Tring Museum 2 ♂♂ from the Sidemi R., Amurland.

The specimen of "*streckeri*," of which Leech, *Trans. Ent. Soc. Lond.* p. 290 (1898), referred to as being darker than *sieversi*, and which apparently convinced him of the specific identity of *streckeri* and *sieversi*, was not *streckeri* at all, but the new *Hyloicus* described on p. 144 of this paper.

XLIII. SPHINGULUS.—Typus : *mus*.

Sphingulus Staudinger, in Rom., *Mém. Lép.* iii. p. 156 (1887) (type : *mus*).

♂♀. Differs from *Kentochrysalis* in the paronychium being without lobes and the pilifer bearing only scales, no bristles.—Antennal segments dilated in ♂, very faintly in ♀, the ciliae shorter in ♀ than in *streckeri*. Palpus small in both sexes

Early stages not known.

Hab. Amurland.

One species.

Staudinger, *l.c.*, says that the hindtibia has only one visible pair of spurs. There are two pairs, but both are short.

134. **Sphingulus mus.**

Sphingulus mus Staudinger, *l.c.* (1887) (Suifun) ; id., *l.c.* vi. p. 227. n. 212 (1892) ; Kirby, *Cat. Lep. Het.* i. p. 695. n. 1 (1892) ; Bartel, in Rühl, *Grossschm.* ii. p. 35 (1899) (Bikin, Suifun vi., Sutsch.an, Baranowka) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 101. n. 741 (1901) (Ussuri).

♂♀. Body very uniform in colour ; the markings having nearly all disappeared. The two most distal lines of the forewing of *K. streckeri* are indicated, the post-discal one by double dots at the veins.

♂. Tenth abdominal tergite about three times as long as basally broad, dorsally clothed with long hair-scales, narrowed towards the apex, which is truncate-sinuate with the angles projecting (Pl. XXVIII. f. 26) ; sternite with a rounded mesial lobe which is about as long as broad, the sides faintly incurved. Clasper covered on the inner surface with long weak hair-scales ; harpe reaching beyond end of clasper (Pl. XXXIX. f. 18), the ventro-distal process gradually narrowed, somewhat curved inward distally, not sharply pointed ; a dorsal process near base, also obtuse. Hook of penis-sheath very long (Pl. XXIX. f. 33) pointed ; inside the sheath there is a patch of spines, which are visible from the outside as brown dots.

♂. The lobe in front of the vaginal cavity sinuate, the vaginal plate rather strongly chitinised (Pl. XXI. f. 20).

Larva and pupa not known.

Hab. Amurland.

In the Tring Museum 3 ♂♂, 5 ♀♀ from Amurland.

Subfamily **Ambulicinae**.—Typus : *Protambulyx strigilis*.

Bombyliae Hübner, *Verz. bek. Schm.* p. 131 (1822) (partim).
Deilephilae id., *l.c.* p. 136 (1822) (partim).
Smerinthi id., *l.c.* p. 141 (1822) (partim).
Chaerocampini Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 159 (1865) (partim ; *nom. indescr.*).
Smerinthini id., *l.c.* p. 160 (1865) (*nom. indescr.*).
" Smérinthides " Boisduval, *Spec. Gén. Lép. Hét.* i. p. 8 (1875) (excl. *Nyceryx*, *Eurypteryx*, *Ceratomia*).
" Leucophlébides " id., *l.c.* p. 54 (1875).
" Déiléphilides " id., *l.c.* p. 158 (1875) (partim ; *Ambulyx* only).
Chaerocampinae Butler, *Trans. Zool. Soc. Lond.* ix. p. 514. 554 (1877) (*Cypa* only).
Ambulicinae id., *l.c.* p. 514. 579 (1877) (*A.? hyposticta* excl. ; type : *strigilis*).
Smerinthinae id., *l.c.* p. 515. 582 (1877) (*Sphingonaepiopsis* excl.).

There is apparently no single character which separates all the members of the present subfamily from all the *Acherontiinae*. An Ambulicine species is distinguished, however, from the *Sphingicae* by the end-segment of the antenna being short, densely scaled above ; the few genera with prolonged end-segment (*Protambulyx*, *Compsogene*, *Oxyambulyx*, *Cypa*) are recognisable by the apex of the forewing being sinuate, or the long tarsi being without a midtarsal comb, or by the distal margin of the forewing being more or less angulate below the middle, or sinuate at apex.

The tribe *Sphingulicae*, in which the end-segment of the antenna is as short as in most *Ambulicinae*, agrees so closely in structure with this subfamily that only a combination of characters separates one group from the other ; the tuft of long hair-scales covering the lower part of the eye in many *Ambulicinae* is absent from or vestigial in *Sphingulicae* ; all the species with irregular distal margin of the forewing, or with the margin concave below the apex, or the apex sinuate, or the margin straight or slightly concave and the tibiae at the same time spinulose, or the forewing with yellow and red shades, as well as the forms without frenulum, or without the proximal pair of hindtibial spurs, or without pulvillus, belong to the *Ambulicinae*.

As in the case of the *Acherontiinae*, the specialisation within the subfamily *Ambulicinae*, which has led to the appearance of a great number of groups of species treated as genera, relates to a variety of organs, many of which become more and more reduced till they vanish. The gradual disappearance of organs, such as the frenulum, the proximal pair of hindtibial spurs, the pulvillus and paronychium, the friction-patch, etc., can equally well be traced in this subfamily as among the *Acherontiinae*. It is here, like there, largely a development by reduction which has given rise to the genera, these being in many cases characterised by the absence or reduction of some particular organ.

The tongue of the *Ambulicinae* does never reach beyond the end of the abdomen ; it is generally short and weak, and there are several species in which it is reduced to two short lobes (Pl. LXII. f. 1). The mesial fringe of the tongue, by which the two halves are kept together above, form in the species with a strong tongue (*Protambulyx* and allies) a kind of thin membrane, the hairs being soldered together, while the fringe of the weak tongue is generally long and loose, the hairs being more or less separate, or is absent (Pl. LXI. f. 10. 11). The base of the tongue is not rarely covered with long weak scales (*Leucophlebia* for instance) ; in *Cypa*

it is tubercled on the upperside near the base. The weak tongue is functionless, only the lower (*i.e.* less specialised or less reduced) forms being able to use the tongue as a sucking-tube. These strong-tongued *Ambulicinae* visit flowers (*Protambulyx strigilis* ; Gundl., *Ent. Cubana* p. 185), while the bulk of the subfamily does not feed.

The pilifer is normally of a rounded triangular shape, with the inner surface clothed with long bristles. These bristles become often modified into scales, either all or part of them; they disappear in a few species almost completely (Pl. LXI. f. 10). The pilifer itself is sometimes reduced to an obtuse triangular projection (Pl. LXI. f. 10), while it is occasionally prolonged, resembling a tooth-brush (Pl. LXII. f. 5). The genal process is triangular, as high, or nearly as high, as the pilifer, seldom reduced (*Cypa*), in which case the pilifer is also reduced. The palpus is large in the lower forms (*Protambulyx*, *Compsogene*, etc.), and becomes very small in a number of genera ; it is generally smaller in the ♀ than in the ♂, so that in this respect the ♀ is the more advanced sex. The joint of the second and third segment is often open, *i.e.*, the scales at the end of the first and the base of the second segment stand so far apart that the naked joint is visible. The most peculiar palpus is found in *Cressonia*, where the long second segments curve sideways, the palpi being divergent, especially in the ♂.

The antenna are never club-shaped, but they are thinner at the base than in and before the middle. The segments are always compressed and grooved in the ♂, with long fasciculated ciliae ; in some cases the upper edge of the groove is dilated laterad, forming short pectinations ; these are enormously prolonged in the African *Ceridia mira* (Pl. LX. f. 27. 28). The so-called bipectinated antennae of the ♂♂ of *Cressonia* and *Monarda* are of an entirely different type, resembling the antennae of *Saturniidae*, as pointed out by John Smith (see *Cressonia*). In the ♀ ♀-antennae we often find the ♂♂-characters repeated, but in a less pronounced form, while in many other species the segments are simple and somewhat depressed. The end-segment, which is always long and rough-scaled in the *Acherontiicae* and *Sphingicae* and short in the *Sphingulicae*, is long in very few *Ambulicinae* (Pl. LX. f. 4. 5. 6) and short in all the others. The segment is rough-scaled only in *Protambulyx*, while it is densely and smoothly scaled on the upperside in the other genera. *Protambulyx* represents in this respect the lowest type.

Spinosity of the tibiae is of equally common occurrence among the *Ambulicinae* as it is among the *Acherontiinae*. The spinosity is not necessarily accompanied by a reduction of parts of the legs. There is no scent-organ at the posterior side of the forecoxae. The foretibia ends often in a thorn, a character independently developing in many not closely related genera, and in a few cases the external spines of the first protarsal segment are enlarged (*Monarda*). The spurs are in some forms very long, the longer terminal one of the hindtibia equalling in length sometimes the first tarsal segment. In the forms where they are most reduced they are so short as to be concealed in the scaling of the tibia. The proximal pair of spurs of the hindtibia disappears often ; *Parum colligata* is very instructive in this respect, as the pair is absent from some individuals and vestigial in others. The distal pair never disappears. In a number of species dealt with under *Polyptychus* the spurs are more or less spinose. A very remarkable character of the legs of the *Ambulicinae* is the non-development of a midtarsal comb even in those species which have long and strong legs, like *Compsogene*, the *Ambulicinae* differing conspicuously therein from the *Sphingicae*, where all the lower forms have

the comb strongly developed, the reduction of the comb and its disappearance taking place later in the series of genera. It is worthy to emphasize again that there is also no comb in the *Sphingulicae*. The pulvillus becomes small in a few species and obliterates entirely in others. The paronychium preserves the two lobes of each side in most *Ambulicinae*; in some the ventral lobe disappears, in a few genera both the ventral and lateral lobes. While in the *Sphingicae* the pulvillus disappears before the paronychium, we find among the *Ambulicinae* forms in which the same is the case, and also such in which the pulvillus is preserved and the paronychial lobes are lost, as is the case in *Sphingulus* of the Acherontiine tribe *Sphingulicae*. The ventral lobe of the paronychium is often broader than the lateral one, but it is never preserved when the lateral lobe disappears.

The shape of the wing is characteristic of a great many *Ambulicinae*: in fact, the insects are generally identified by Lepidopterists as belonging to this subfamily more by the aspect, the shape and colour of the wings and body, than by special structural characters, and it is, therefore, quite natural that some species of other subfamilies have erroneously been brought, by previous authors, into the present subfamily, and some members of the *Ambulicinae* placed somewhere else. The irregular distal margin of the wings which gives so many forms a certain resemblance to leaves is not confined to the *Ambulicinae*; we meet again with a similar shape among the *Sesiinae* and *Philampelinae*, but never among the *Acherontiinae*, which is very curious. The falcate forewing of many *Ambulicinae* is found also among the *Philampelinae*, *Sesiinae*, and the *Choerocampinae*, not among the *Acherontiinae*. These similarities have been mistaken for indications of closer relationship. Many *Ambulicinae* are protectively coloured; the forewing assuming grey and clayish tints, and some resemble more closely an even-edged lanceolate leaf by the development of a dark longitudinal line or shade representing the midrib (*Phylloxiphia*, *Clanis*). Though bright colours may be said to prevail among the *Ambulicinae*, there are a great number of very soberly grey-coloured species. The discal streaks R^2—M^2 present on the forewing of so many *Acherontiinae* do not appear here.

The spines at the edges of the abdominal segments are always weak and elongate; they disappear, or rather become modified into scales, in several species, while on the other hand, the underscales of the abdominal tergites are often spiniform, there being in some species no large dentate scales present on the tergites. The sternites have only in the lowest forms (*Protambulyx* and allies) some weak spines at the edges; the bulk of the *Ambulicinae* is without them. The abdomen is often curved upwards as in some *Sphingulicae*.

The peculiar organ of friction on the clasper of the ♂ and the inner edge of the eighth tergite resembles closely that found among the *Acherontiinae* in so far as the modified scales of the clasper are small and form a patch, differing widely from the enlarged friction-scales of the *Sphingidae semanophorae*. Sometimes the friction-scales are reduced to dispersed hairs, or there are in their place only dispersed granules. The patch is present in the lower forms (*Protambulyx* and allies) and disappears later on, all the more highly modified genera being without it. The same applies to the patch of the *Acherontiinae*. The regular ribbon of enlarged scales at the edge of the eighth tergite, on the inner surface, most conspicuous in *Acanthosphinx* (Pl. LIX. f. 1), is not met with in other subfamilies; it is also less regular than in *Acanthosphinx* in most other *Ambulicinae* with a friction-patch on the clasper, and is sometimes replaced by rough, long, narrow scales, or is absent.

The copulatory armature is on the whole complicated in this subfamily, the species differing often very remarkably from one another. The greater proportion of the species are slow-flying insects which do not wander much, and that accounts largely for the astonishingly great differences presented by the geographical races of several species (compare *Pseudoclanis postica*, *Polyptychus trilineatus*).

The early stages of the *Ambulicinae* are interesting on account of several peculiar points in their structure. The larvae are generally said to be characterised by a triangular head and a granulose skin. These characters are indeed found in the European and American species, but not in all the African and Indian ones. So far as the larvae are known, and so far as the descriptions and figures are reliable, there is no smooth-skinned larva among the *Ambulicinae*, all being granulose or spinose. The granules are prolonged to short spines in *Cocquosa*, to longer and stronger spines in *Rhadinopasa*, and to long dentate ones in *Lophostethus*. Of these larvae *Cocquosa* has a triangular head, while it is rounded in the other two. A rounded head is also found in the full-grown larvae of *Daphnusa* and *Clanis* (and perhaps in other genera). Now the question arises whether the bulky-headed larva of these genera, which are not all closely allied with one another, has preserved the ancestral head-form of the Ambulicine larva, or whether the triangular head is the more generalised one, from which the round head of *Clanis*, etc., originated. The first stage is not known of any of these larvae, unfortunately, but Forsayeth figures the younger larva of *Clanis* (*Trans. Ent. Soc. Lond.* 1884. p. 393. t. 15) as having a triangular head, and states that the rounded bulky head is acquired at a later stage. From this one must conclude that in the large-headed larva the triangular head-form is lost in consequence of a lateral expansion of the head-case. But this does not necessarily mean that the ancestral larva of the *Ambulicinae* had a triangular head. Considering that the first stage of *Sphinx ocellata* (and also of the Acherontiine genus *Lapara*) presents a rounded head, which assumes later on the well-known triangular form, and that the head of *Polyptychus grayi* is produced in the earlier stages into a long process, and assumes an obtusely triangular form in the last stage, it seems to be probable that the triangular head is a derivation from a rounded one, and has developed again in some instances into an enlarged rounded head. Thus the caterpillars of *Lophostethus*, *Daphnusa*, *Rhadinopasa* and *Clanis* would be later forms than the acrocephalic larvae of other *Ambulicinae*. If this is true, the spines of *Rhadinopasa* and *Lophostethus* would also appear to be exaggerated developments of the setiferous granules of *Marumba* and others, and would not represent an ancestral feature preserved from the common ancestor of the *Sphingidae* and *Saturniidae*. It is necessary to study the first stages of the *Sphingidae* more closely and of more species than has hitherto been done. We have almost entirely to depend on descriptions and figures, which mostly fail in giving the essential points. The conclusions based on such scanty and not always reliable data are not convincing.

The horn is long and curves gently upwards in the generalised forms ; it is occasionally lost (*Coequosa*).

The chrysalis of the *Ambulicinae* is as a rule rather stumpy at the frontal end ; in many forms the frontal part bears two tubercles. The sheath of the tongue never projects, as in the greater proportion of the *Acherontiinae* ; it reaches either to the end of the wing-cases (rarely, *Compsogene* only ?), or is shortened. A comparatively long tongue-case is retained in some species which have a strongly reduced tongue (*Mimas tiliae*, for instance). This fact, which is corroborated by the preservation

of a long tongue-case in the short-tongued *Acherontia*, proves the short-tongued forms to be derivations from longer-tongued species. There occur some peculiar pupae in this subfamily: for instance, that of *Langia*, which is truncate apically and has no cremaster: the chrysalis of *Cressonia* with the preanal segments flattened ventrally and carinate laterally; the chrysalis of *Phyllosphingia* with prominent tubercles serving locomotion.

From the morphological characters of the imagines stated above it will have become clear that the genera *Protambulyx*, *Amplypterus*, etc., represent the earlier *Ambulicinae*, and are not separable from this subfamily. The elongate forewings are not a character confined to *Protambulyx* and allies; the comparatively strong and long tongue is met with also among *Polyptychus* and near relatives; and the lateral "expansions" of the abdomen—they are tufts of scales—by which Hampson characterised the "*Ambulicinae*" are found only in the Indian genus *Oxyambulyx*. On the other hand, the tongue is very short in some American forms which are close allies of *Amplypterus*, and one of these has even the outer margin of the forewing of the ordinary irregular type (*Trogolegnum*). *Callambulyx rubricosa*, hitherto considered a true *Protambulyx*, is much more closely related to *Sphinx ocellata* than to *Protambulyx*. The connection between the specialised species of *Ambulicinae* and *Protambulyx* and allies is so close that there is no justification for separating *Protambulyx* and allies as another subfamily. This will more clearly be understood by comparing the following key to the probable phylogenetic connection between the various genera. It will be noticed that here, as among the *Acherontiinae* (p. 4), similarity in structure arrived at in consequence of the reduction or loss of organs does not necessarily mean close relationship, the most specialised forms of the various branches agreeing in several characters which they have independently acquired. The various genera represent in this key steps in the development of the organs mentioned; each genus has besides, as a rule, its own specialisations not mentioned in the key, making it obvious that probably not one of the genera is the ancestor of the next higher one, but that both come from a common stem.

There are 130 odd species known, which fall into 44 genera. The subfamily is distributed all over the globe, except the far north. South and Central America have few representatives, all of the lower type (*Protambulyx*) or closely related to it. The headquarters of the subfamily are in Africa and India. On the former continent many new forms will be discovered when the fauna, especially of the western side, becomes more fully explored.

Though the *Ambulicinae* do not fall into several definable tribes, there are nevertheless some groups of genera closely related *inter se*. The four Neotropical genera, *Protambulyx*, *Amplypterus*, *Orecta* and *Trogolegnum*, form one group; the last two genera are developments from ancestral *Amplypterus*, having acquired specialisations which are found again in other branches of *Ambulicinae*: for instance, the undulated distal margin of the forewing of *Trogolegnum* and the apical protibial thorn of *Orecta*, specialisations accompanied by a strong reduction of the tongue, and in the ♂ by the loss of the friction-patch. Another rather well circumscribed group are the eyed *Ambulicinae*, of which *Callambulyx rubricosa* is the most generalised member, while *Cressonia* is the most specialised; the group is Holarctic, extending into the Oriental Region with two genera.

The connection between *Clanis*, *Pseudoclanis*, and *Platysphinx* is very obvious, and the relationship of *Leucophlebia* and *Leptoclanis* with the same branch becomes also evident on a close comparison of the structure, as pointed out under *Leptoclanis*.

The genus *Polyptychus*, though comprising homogeneous material, is so much diversified that it will have to be divided up when the African fauna is better known. Two Oriental genera (*Daphnusa* and *Marumba*) are derivations from this Aethiopian and Indo-Malayan genus *Polyptychus*, while the other modifications are all Aethiopian.

Key to the genera:

a.	Midtibia with spines, at least at end	*b.*
	Midtibia without spines	*m.*
b.	Two pairs of spurs to hindtibia, with frenulum	*c.*
	Two pairs of spurs to hindtibia, without frenulum	*l.*
	One pair of spurs to hindtibia	*h.*
c.	No paronychium	LVIII. *Leptoclanis.*
	With paronychium, no pulvillus	LXIX. *Lophostethus.*
	With paronychium, with pulvillus	*d.*
d.	Hinder angle of forewing not indicated, the wing evenly rounded from base to near apex	LXI. *Phylloxiphia.*
	Hinder angle of forewing at least indicated	*e.*
e.	Forewing with a broad pale yellow streak from base to apex	LIX. *Leucophlebia.*
	Forewing without such a streak	*f.*
f.	Hindwing yellow, red, or pinkish grey, with large black basal patch	LVI. *Pseudoclanis.*
	Hindwing not so; palpus small, rough with hair-scales, joint not open	LXXVIII. *Mimas.*
	Hindwing not so; palpus not rough with hair-scales, joint open; or distal margin of forewing even	*g.*
g.	Joint of palpus not open; long terminal spur of hindtibia obviously shorter than first tarsal segment	LV. *Clanis.*
	Joint of palpus open; long terminal spur of hindtibia obviously shorter than first tarsal segment	LX. *Polyptychus.*
	Joint of palpus open; long terminal spur of hindtibia as long as first tarsal segment	LXVIII. *Acanthosphinx.*
h.	Foretibia ending in a prominent thorn	*i.*
	Foretibia not ending in a thorn	*j.*
i.	Wings red and green	LXXI. *Rhodoprasina.*
	Wings not red and green; antenna pectinated	LXVII. *Ceridia.*
	Wings not red and green; antenna not pectinated	LXIV. *Marumba.**

* Only *indicus.*

j. Forewing produced at apex into a long curved lobe . . . . LXII. *Lycosphingia*.
Forewing not produced at apex; hindwing yellow, with a large black basal patch . . . . LVII. *Platysphinx*.
Forewing not produced at apex; hindwing not yellow . . . . *k*.

k. SC^2 and R^1 of hindwing on a long stalk . . . . . LXV. *Daphnusa*.
SC^2 and R^1 of hindwing on a short stalk, or not stalked; pulvillus large; paronychium with two lobes LXIV. *Maruмba*.
SC^2 and R^1 of hindwing on a short stalk, or not stalked; pulvillus small; paronychium with one lobe . . . . . LXVI. *Poliodes*.
SC^2 and R^1 of hindwing on a short stalk, or not stalked; no paronychium . . . . . LXIII. *Likoma*.

l. Palpi divergent; distal margin of forewing not irregular . . . LXXXVII. *Cressonia*.
Palpi not divergent; distal margin of forewing very irregular . . LXXXIV. *Phyllosphingia*.

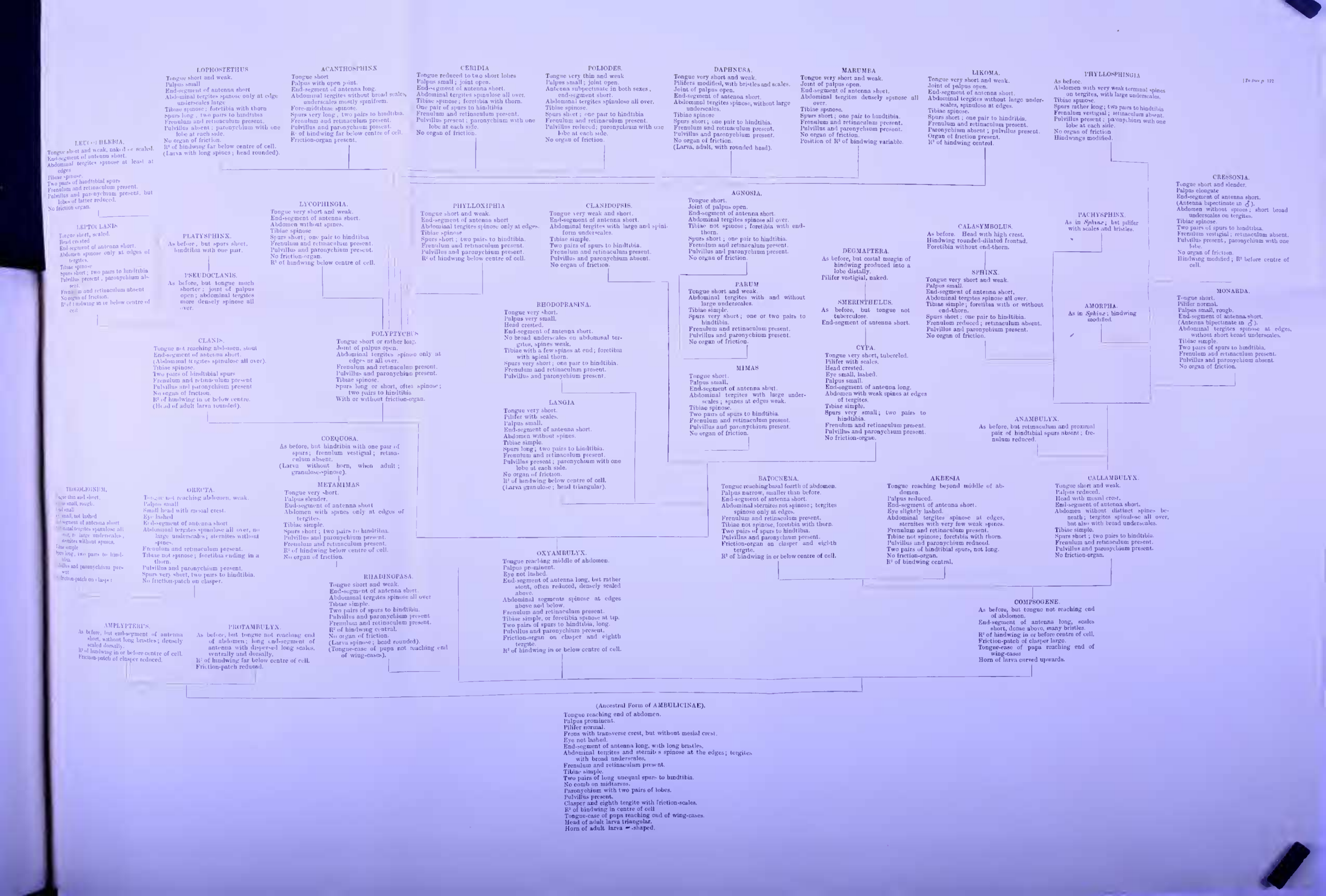
m. Hindtibia with one pair of spurs; with frenulum . . . . . *b'*
Hindtibia with one pair of spurs; without frenulum . . . . . *n*.
Hindtibia with two pairs of spurs; without frenulum . . . . . *o*.
Hindtibia with two pairs of spurs; with frenulum . . . . . *r*.

n. Apex of forewing pointed . . LXXX. *Anambulyx*.
Apex of forewing rounded-truncate; SC^2 and R^1 of hindwing on a rather long stalk . . . LIV. *Coequosa*.
Apex of forewing rounded; SC^2 and R^1 of hindwing on a very short stalk, or separate . . . . LXXIV. *Parum*.

o. Hindwing very broad, apex lobed . . . *p*.
Hindwing of the ordinary triangular form . . . . . *q*.

p. Hindwing without eye-spot . . LXXXIII. *Amorpha*.
Hindwing with eye-spot . . . LXXXII. *Calasymbolus*.

q. Distal margin of forewing irregular; pilifer with bristles . . . LXXXI. *Sphinx*.
Distal margin of forewing irregular; pilifer with bristles and scales . LXXXV. *Pachysphinx*.
Distal margin of forewing even; hindwing not red . . . LXXIV. *Parum*.


LOPHOSTETHUS
Tongue short and weak.
Palpus small
End-segment of antenna short
Abdominal tergites spinose only at edge
undersculs large
Tibiae spinose; foretibia with thorn
Spurs long, two pairs to hindtibia
Frenulum and retinaculum present.
Pulvillus absent; paronychium with one lobe at each side.
No organ of friction.
R¹ of hindwing far below centre of cell.
(Larva with long spines; head rounded).
ACANTHOSPHINX
Tongue short
Palpus with open joint.
End-segment of antenna long.
Abdominal tergites without broad scales, undersculs mostly spiniform.
Fore-midtibiae spinose.
Spurs very long, two pairs to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
R¹ of hindwing far below centre of cell.
Friction-organ present.
CERIDIA
Tongue reduced to two short lobes
Palpus small; joint open.
End-segment of antenna short.
Abdominal tergites spinulose all over.
Tibiae spinose; foretibia with thorn.
One pair of spurs to hindtibia
Frenulum and retinaculum present.
Pulvillus present; paronychium with one lobe at each side.
No organ of friction.
POLIODES.
Tongue very thin and weak
Palpus small; joint open.
Antenna subpectinate in both sexes, end-segment short.
Abdominal tergites spinulose all over.
Tibiae spinose.
Spurs short; one pair to hindtibia
Frenulum and retinaculum present.
Pulvillus reduced; paronychium with one lobe at each side.
No organ of friction.
DAPHNUSA.
Tongue very short and weak.
Pilifers modified, with bristles and scales.
Joint of palpus open.
End-segment of antenna short.
Abdominal tergites spinose, without large undersculs.
Tibiae spinose
Spurs short; one pair to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
No organ of friction.
(Larva, adult, with rounded head).
MARUMBA
Tongue very short and weak.
Joint of palpus open.
End-segment of antenna short.
Abdominal tergites densely spinose all over.
Tibiae spinose.
Spurs short; one pair to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
No organ of friction.
Position of R² of hindwing variable.
LIKOMA.
Tongue very short and weak.
Joint of palpus open.
End-segment of antenna short.
Abdominal tergites without large undersculs, spinulose at edges.
Tibiae spinose.
Spurs short; one pair to hindtibia.
Frenulum and retinaculum present.
Paronychium absent; pulvillus present.
Organ of friction present.
R² of hindwing central.
PHYLLOSPHINGIA
As before.
Abdomen with very weak terminal spines on tergites, with large undersculs.
Tibiae spinose.
Spurs rather long; two pairs to hindtibia
Frenulum vestigial; retinaculum absent.
Pulvillus present; paronychium with one lobe at each side.
No organ of friction
Hindwings modified.
[To face p. 172
LECCOLEBIA.
Tongue short and weak, naked or scaled.
End-segment of antenna short.
Abdominal tergites spinose at least at edges
Tibiae spinose.
Two pairs of hindtibial spurs
Frenulum and retinaculum present.
Pulvillus and paronychium present, but lobes of latter reduced.
No friction organ.
LEPTOCLANIS
Tongue short, scaled.
Head crested
End-segment of antenna short.
Abdomen spinose only at edges of tergites.
Tibiae spinose
Spurs short; two pairs to hindtibia
Pulvillus present, paronychium absent
Frenulum and retinaculum absent
No organ of friction.
R¹ of hindwing in or below centre of cell
PLATYSPHINX.
As before, but spurs short, hindtibia with one pair.
PSEUDOCLANIS.
As before, but tongue much shorter; joint of palpus open; abdominal tergites more densely spinose all over.
LYCOPHINGIA.
Tongue very short and weak.
End-segment of antenna short.
Abdomen without spines.
Tibiae spinose
Spurs short; one pair to hindtibia
Frenulum and retinaculum present.
Pulvillus and paronychium present.
No friction-organ.
R² of hindwing below centre of cell.
PHYLLOXIPHIA
Tongue short and weak.
End-segment of antenna short
Abdominal tergites spinose only at edges.
Tibiae spinose
Spurs short; two pairs to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
R² of hindwing below centre of cell.
CLANIDOPSIS.
Tongue very weak and short.
End-segment of antenna short.
Abdominal tergites with large and spiniform undersculs.
Tibiae simple.
Two pairs of spurs to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium absent.
No organ of friction.
AGNOSIA.
Tongue short.
Joint of palpus open.
End-segment of antenna short.
Abdominal tergites spinose all over.
Tibiae not spinose; foretibia with end-thorn.
Spurs short; one pair to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
No organ of friction.
CALASYMBOLUS.
As before. Head with high crest.
Hindwing rounded-dilated frontad.
Foretibia without end-thorn.
PACHYSPHINX.
As in *Sphinx*; but pilifer with scales and bristles.
CRESSONIA.
Tongue short and slender.
Palpus elongate
End-segment of antenna short.
(Antenna bipectinate in ♂).
Abdomen without spines; short broad undersculs on tergites.
Tibiae spinose.
Two pairs of spurs to hindtibia.
Frenulum vestigial; retinaculum absent.
Pulvillus present, paronychium with one lobe.
No organ of friction.
Hindwing modified; R² before centre of cell.
DEGMAPTERA.
As before, but costal margin of hindwing produced into a lobe distally.
Pilifer vestigial, naked.
SPHINX.
Tongue very short and weak.
Palpus small.
End-segment of antenna short,
Abdominal tergites spinose all over.
Tibiae simple; foretibia with or without end-thorn.
Spurs short; one pair to hindtibia.
Frenulum reduced; retinaculum absent.
Pulvillus and paronychium present.
No organ of friction.
AMORPHA.
As in *Sphinx*; hindwing modified.
MONARDA.
Tongue short.
Pilifer normal.
Palpus small, rough.
End-segment of antenna short.
(Antenna bipectinate in ♂).
Abdominal tergites spinose at edges, without short broad undersculs.
Tibiae simple.
Two pairs of spurs to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium absent.
No organ of friction.
RHODOPRASINA.
Tongue very short.
Palpus very small.
Head crested.
End-segment of antenna short.
No broad undersculs on abdominal tergites, spines weak.
Tibiae with a few spines at end; foretibia with apical thorn.
Spurs very short; one pair to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
PARUM
Tongue short and weak.
Abdominal tergites with and without large undersculs.
Tibiae simple.
Spurs very short; one or two pairs to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
No organ of friction.
SMERINTHELUS.
As before, but tongue not tuberculose.
End-segment of antenna short.
CLANIS.
Tongue not reaching abdomen, stout
End-segment of antenna short.
(Abdominal tergites spinulose all over).
Tibiae spinose.
Two pairs of hindtibial spurs
Frenulum and retinaculum present
Pulvillus and paronychium present
No organ of friction.
R¹ of hindwing in or below centre.
(Head of adult larva rounded).
POLYPTYCHUS
Tongue short or rather long.
Joint of palpus open.
Abdominal tergites spinose only at edges or all over.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
Tibiae spinose.
Spurs long or short, often spinose; two pairs to hindtibia
With or without friction-organ.
LANGIA
Tongue very short.
Pilifer with scales.
Palpus small.
End-segment of antenna short.
Abdomen without spines.
Tibiae simple.
Spurs long; two pairs to hindtibia.
Frenulum and retinaculum present.
Pulvillus present; paronychium with one lobe at each side.
No organ of friction.
R¹ of hindwing below centre of cell.
(Larva granulose; head triangular).
MIMAS
Tongue short.
Palpus small.
End-segment of antenna short.
Abdominal tergites with large undersculs; spines at edges weak.
Tibiae spinose.
Two pairs of spurs to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
No organ of friction.
CYPA.
Tongue very short, tuberculed.
Pilifer with scales.
Head crested.
Eye small, lashed.
Palpus small.
End-segment of anteona long.
Abdomen with weak spines at edges of tergites.
Tibiae simple.
Spurs very small; two pairs to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
No friction-organ.
COEQUOSA.
As before, but hindtibia with one pair of spurs; frenulum vestigial; retinaculum absent.
(Larva without horn, when adult; granulose-spinose).
METAMIMAS
Tongue very short.
Palpus slender.
End-segment of antenna short
Abdomen with spines only at edges of tergites.
Tibiae simple.
Spurs short; two pairs to hindtibia.
Pulvillus and paronychium present.
Frenulum and retinaculum present.
R¹ of hindwing below centre of cell.
No organ of friction.
ANAMBULYX.
As before, but retinaculum and proximal pair of hindtibial spurs absent; frenulum reduced.
TRIGOLEGNUM.
Tongue thin and short.
Palpus small, rough.
Pilifer small
Head crested, not lashed
End-segment of antenna short
Abdominal tergites spinulose all over, no large undersculs; sternites without spines.
Frenulum and retinaculum present.
Tibiae simple
Spurs long, two pairs to hindtibia.
Pulvillus and paronychium present
No friction-patch on clasper
ORECTA.
Tongue not reaching abdomen, weak.
Palpus small
Small head with mesial crest.
Eye lashed
End-segment of antenna short
Abdominal tergites spinulose all over, no large undersculs; sternites without spines.
Frenulum and retinaculum present.
Tibiae not spinose; foretibia ending in a thorn.
Pulvillus and paronychium present.
Spurs very short, two pairs to hindtibia.
No friction-patch on clasper.
RHADINOPASA.
Tongue short and weak.
End-segment of antenna short.
Abdominal tergites spinose all over
Tibiae simple.
Two pairs of spurs to hindtibia.
Pulvillus and paronychium present.
Frenulum and retinaculum present.
R² of hindwing central.
No organ of friction.
(Larva spinose; head rounded).
(Tongue-case of pupa not reaching end of wing-cases).
BATOCNEMA.
Tongue reaching basal fourth of abdomen.
Palpus narrow, smaller than before.
End-segment of antenna short.
Abdominal sternites not spinose; tergites spinose only at edges.
Frenulum and retinaculum present.
Tibiae not spinose, foretibia with thorn.
Two pairs of spurs to hindtibia.
Pulvillus and paronychium present.
Friction-organ on clasper and eighth tergite.
R² of hindwing in or below centre of cell.
AKBESIA
Tongue reaching beyond middle of abdomen.
Palpus reduced.
End-segment of antenna short.
Eye slightly lashed.
Abdominal tergites spinose at edges, sternites with very few weak spines.
Frenulum and retinaculum present.
Tibiae not spinose; foretibia with thorn.
Pulvillus and paronychium reduced.
Two pairs of hindtibial spurs, not long.
No friction-organ.
R² of hindwing central.
CALLAMBULYX.
Tongue short and weak.
Palpus reduced.
Head with mesial crest.
End-segment of antenna short.
Abdomen without distinct spines beneath; tergites spinulose all over, but also with broad undersculs.
Tibiae simple.
Spurs short; two pairs to hindtibia.
Frenulum and retinaculum present.
Pulvillus and paronychium present.
No friction-organ.
OXYAMBULYX.
Tongue reaching middle of abdomen.
Palpus prominent.
Eye not lashed.
End-segment of antenna long, but rather stout, often reduced, densely scaled above.
Abdominal segments spinose at edges above and below.
Frenulum and retinaculum present.
Tibiae simple, or foretibia spinose at tip.
Two pairs of spurs to hindtibia, long.
Pulvillus and paronychium present.
Friction-organ on clasper and eighth tergite.
R² of hindwing in or below centre of cell.
COMPSOGENE.
As before, but tongue not reaching end of abdomen.
End-segment of antenna long, scales short, dense above, many bristles.
R² of hindwing in or before centre of cell.
Friction-patch of clasper large.
Tongue-case of pupa reaching end of wing-cases
Horn of larva curved upwards.
AMPLYPTERYX.
As before, but end-segment of antenna short, without long bristles; densely scaled dorsally.
R² of hindwing in or before centre of cell.
Friction-patch of clasper reduced.
PROTAMBULYX.
As before, but tongue not reaching end of abdomen; long end-segment of antenna with dispersed long scales, ventrally and dorsally.
R² of hindwing far below centre of cell.
Friction-patch reduced.
(Ancestral Form of AMBULICINAE).
Tongue reaching end of abdomen.
Palpus prominent.
Pilifer normal.
Frons with transverse crest, but without mesial crest.
Eye not lashed.
End-segment of antenna long, with long bristles.
Abdominal tergites and sternites spinose at the edges; tergites with broad undersculs.
Frenulum and retinaculum present.
Tibiae simple.
Two pairs of long unequal spurs to hindtibia.
No comb on midtarsus.
Paronychium with two pairs of lobes.
Pulvillus present.
Clasper and eighth tergite with friction-scales.
R² of hindwing in centre of cell
Tongue-case of pupa reaching end of wing-cases.
Head of adult larva triangular.
Horn of adult larva ⌐-shaped.

r.	Foretibia ending in a prominent thorn . .	*s.*
	Foretibia not ending in a prominent thorn	. . *t.*
s.	Apex of forewing pointed . . .	XLVI. *Orecta.*
	Apex of forewing truncate-sinuate : distal margin of forewing irregular	L. *Akbesia.*
	Apex of forewing truncate-sinuate ; distal margin of forewing even .	XLIX. *Batocnema.*
t.	No pulvillus	LXXII. *Clanidopsis.*
	With pulvillus ; end-segment of antenna long	. . *u.*
	With pulvillus ; end-segment of antenna less than four times as long as basally high	. . *w.*
u.	Spurs very short	LXXV. *Cypa.*
	Longer spurs several times as long as the tibia is broad . . .	. . *v.*
v.	Apex of forewing sinuate . . .	XLIV. *Protambulyx.*
	Apex of forewing acute . . .	LI. *Oxyambulyx.*
	Apex of forewing rounded-truncate .	XLVIII. *Compsogene.*
w.	First segment of foretarsus short, with some prolonged spines . .	LXXXVI. *Monarda.*
	First segment of foretarsus normal ; spurs short	. . *x.*
	First segment of foretarsus normal ; spurs long	. . *z.*
x.	Costal margin of hindwing dilated distally into a lobe	LXXVII. *Degmaptera.*
	Costal margin of hindwing normal .	. . *y.*
y.	Apex of forewing acute, distal margin even	LXXIX. *Callambulyx.*
	Apex of forewing sinuate, distal margin uneven, hindwing red . .	XLVII. *Trogolegnum.*
	Apex of forewing sinuate, distal margin uneven, hindwing not red .	LXXVI. *Smerinthulus.*
z.	Distal margin of forewing uneven .	LXX. *Langia.*
	Distal margin of forewing even, apex sinuate	XLV. *Amplypterus.*
	Distal margin of forewing even, apex rounded-truncate	. . *a'.*
a'.	Hindtarsus about as long as cell of hindwing, measured along SC .	LIII. *Metamimas.*
	Hindtarsus half as long again as cell of hindwing	LII. *Rhadinopasa.*
b'.	Foretibia ending in a thorn . .	LXXIII. *Agnosia.*
	Foretibia not ending in a thorn . .	LXXIV. *Parum.*

XLIV. PROTAMBULYX gen. nov.—Typus : *strigilis*.

Sphinx Linné (*non* id., 1758), *Mant. Plant.* p. 538 (1771).
Pholus Hübner, *Verz. bek. Schm.* p. 134 (1822) (partim ; type : *achemon*).
Sphinx (*Ambulyx*), Westwood, *Cab. Or. Ent.* p. 61 (1848) (*nom. nud.*)
Ambulyx Walker, *List Lep. Ins. B. M.* viii. p. 121) (1856) (partim ; Lincl. type of *Amplypterus*.

♂ ♀. Tongue reaching to middle of abdomen or beyond, longer in ♂ than in ♀. Pilifer long ; genal process triangular, as high as the pilifer. Frons and terminal surface of palpi almost on a level, ventral angle of second segment somewhat rounded, terminal surface smaller than in *Amplypterus*. A high transverse crest between antennae, almost vertical in front, slanting behind. Antenna 3 mm. (♂) to 5 mm. (♀) shorter than R^3 of forewing ; end-segment (Pl. LX. f. 4) very *long* and thin, the thicker basal portion densely scaled dorsally, ciliate ventrally, the rest of the segment beset all round with single long scales which are more or less erect, giving the segment a peculiar appearance ; the segment bears ventrally two or three bristles, but none at the end ; ♂: compressed, not deeply grooved ventral surface of segments rather broad, fasciculated ciliae of distal row not long, the series reaching barely halfway down the segment, distal segments not grooved, almost cylindrical ; ♀: proximal series of prolonged ciliae vestigial. Abdomen with weak spines at the edges of the distal sternites ; tergites with numerous spines at the edges. Clasper and eighth tergite with friction-scales, eighth sternite mesially lobed ; no distinct lateral tuft to eighth segment. Tibiae not spinose, as long as the respective first tarsal segments ; spurs very unequal, short ones about one-third or one-half the length of the long ones, longer apical one of hindtibia less than one-half the length of the first tarsal segment ; pulvillus and paronychium present, the latter with two pairs of lobes. Distal margin of forewing excised between SC^1 and SC^5, the lobe SC^5 mostly little produced, less prominent than lobe SC^4 ; R^2 of hindwing far *below* centre of cell, D^3 as long as, or shorter than, D^4.

Larva and chrysalis probably essentially as in *Amplypterus*.

The interantennal crest is olive or tawny in front, much paler behind. The dark band of the thorax does not extend to the lateral edge of the mesothoracic tegula, the lateral fringe of the tegula remaining pale. The abdomen has a more or less continuous dorsal line, and oblique dorso-lateral stripes arranged as in the caterpillar ; the sternites bear very thin obliquely placed lines and a mesial line ; the first tergite is concolorous with the other segments, or darker. Tibiae without basal spot.

Hab. Tropical and Subtropical America, from Southern Brazil to Mexico ; Bahamas ; West Indian Islands : Cuba, Haiti, Jamaica, Porto Rico, St. Vincent.

Eight species.

Key to the species :

a.	No submarginal line on forewing . . .	142. *P. carteri*.
	Submarginal line on forewing distinct	*b*.
b.	Forewing above without conspicuous rounded stigma	*c*.
	Forewing above with conspicuous rounded stigma	*e*.
c.	Forewing above with broad oblique subbasal band from inner margin to (SM^1) . .	139. *P. astygonus*.
	The band absent or represented by a small spot . . .	*d*.

d.	Hindwing above tawny	141. *P. strigilis.*
	Hindwing above lemon-yellow . . .	138. *P. sulphurea.*
e.	Distal marginal band of forewing below pointed at SC^5	*f.*
	Distal marginal band of forewing about 2 mm. broad at SC^5	136. *P. eurydas.*
f.	External discal line of hindwing above concave between C and R^3, strongly angulate at R^3	135. *P. eurycles.*
	This line evenly convex or very obtusely angulate at R^3	*g.*
g.	Distal marginal area of forewing below of almost even width from R^1 to M^1 . .	137. *P. ockendeni.*
	This area very broad at R^2, here more than twice as wide as at M^1	140. *P. goeldii.*

135. **Protambulyx eurycles** (Pl. LXVII. f. 10, ♂).

**Ambulyx eurycles* Herrich-Schäffer, *Aussereur. Schm.* i. p. 59. f. 102 (1854) (Surinam ;—coll. Staudinger) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 187. n. 9 (1875) (Cayenne ; Brazil) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 579. n. 2 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 675. n. 8 (1892) ; Rothsch., Nov. Zool. i. p. 541 (1894) (Aroa, Venezuela) ; Bönningh., *Iris* xii. p. 115. n. 17 (1899) (Rio de Janeiro).

Ambulix (!) *eurycles*, Ménétriés, *Enum. Corp. Anim. Petr., Lep.* p. 93. n. 1550 (1857) (Surinam).

♂ ♀. The greenish olive-brown colour of the upperside of the abdomen is liable to fade into ochre yellow ; the forewing is heavier marked in the ♂ than in the ♀. The hindwing varies somewhat in the depth of the yellow colour. The species is easily distinguished from *strigilis* by the much paler yellow tint of the upperside of the hindwing and of the underside of the body and wings, by the more prominent lobe SC^5 of the forewing, the large olive black subbasal patch of the upperside, and the broader brown marginal band of the underside of the forewing, etc.

♂. Eighth abdominal sternite mesially produced into a strong but short and blunt process (Pl. XXII. f. 19). Tenth sternite (Pl. XXIII. f. 3) produced into a lobe which is somewhat narrowed towards the end, which is almost evenly rounded, the mesial sinus being, however, traceable in an anal view. The patch of modified scales on the clasper (Pl. LVIII. f. 31) broader dorsally than laterally, larger than in *strigilis* ; harpe not raised above the plane of the clasper, having neither distinct ridges nor processes ; it is separated from the clasper by a furrow, and is triangular in shape (Pl. XXXI. f. 2). The penis-sheath is provided dorsally by a short apical ridge, which is slightly dentate, and curves proximad into the interior of the sheath (Pl. XXX. f. 16).

♀. Proximal edge of vaginal orifice less elevate than in *strigilis*, hinder wall of cavity mesially carinate.

Early stages not known.

Hab. South America, from Colombia to Rio de Janeiro.

In the Tring Museum 5 ♂♂, 3 ♀♀ from : Peru ; Aroa, Venezuela, April ; Rio Demerara ; Rio de Janeiro. In the Bern Museum from Para, vi. viii. (Dr. Goeldi).

136. **Protambulyx euryalus** spec. nov. (Pl. I. f. 3, ♂ ; Pl. LXVII. f. 9, ♂

♂ ♀. Similar to *A. eurycles*. Second abdominal segment less grey above.

Wings, *upperside*.——Forewing: more buffish, less grey, than in *eurycles*. The olive-green costal patches from the base to SC^5 larger than in *eurycles*, the two patches at the end of the cell and distally of it touching each other at the edge of the wing, or nearly so, a distinct blackish brown marginal band of nearly even width, tapering in front, limited by a blackish line which begins at the very extremity of SC^5; contiguous with this line and standing at its proximal side an olive-green, sharply defined band, which is broadest between R^1 and R^2, where it equals in breadth the marginal band, while in *eurycles* the olive-green band is much less sharply defined, and much wider between R^1 and R^2.——Hindwing: apex less pointed than in *eurycles* and anal angle less produced; the postdiscal black band, which in *eurycles* is distally *concave* between C and R^3 and therefore *angled* at the latter vein, is nearly evenly curved; abdominal margin more grey in ♀ than in *eurycles*.

Underside, the line outside the cell of both wings and the postdiscal one of the hindwing rather heavier than in *eurycles*.——Forewing: discal line closer to cell than in the preceding species; the brown marginal area about 2 mm. broad at SC^5, while in *eurycles* it is narrowed to a point at the end of SC^5; the area is much more even in width, being not much broader between R^1 and R^2 than at R^3, while in *eurycles* the area is much broader between R^1 and R^2 than at R^3; the posterior discal lines vestigial.——Hindwing: the postdiscal line not concave between C and R^3, but slightly convex; no discocellular bar.

♂. The eighth abdominal sternite has mesially just a trace of a lobe (Pl. XXII. f. 22). The harpe (Pl. XXXI. f. 1) has a submesial process (*pm*), and the edge *md* is also more raised than in *eurycles*. The penis-sheath (Pl. XXX. f. 17) has a longer and non-dentate apical ridge. The tenth sternite (Pl. XXIII. f. 6) is truncate, with the angles strongly rounded. The patch of scales on the clasper is very broad (Pl. LVIII. f. 32), at least three times as wide as in *eurycles*.

♀. Not dissected.

Early stages not known.

Hab. South America: Venezuela; Peru.

One ♂ and three ♀♀ in the Tring Museum from: Merida (*type*, Briceno); Santo Domingo, Carabayo, S.E. Peru, i. vi. 1902 (Ockenden).

In the lobe SC^5 of the forewing being less prominent than the apical lobe, and in the marginal band of the underside of the forewing not narrowing to a point at SC^5, *euryalus* agrees with *strigilis*, while *eurycles* agrees in the same points with *sulphurea*.

137. **Protambulyx ockendeni** spec. nov. (Pl. LXVII. f. 7, 8, ♂).

♂ ♀. Similar to *A. euryalus*.

Wings, *upperside*.——Forewing less variegated, basal half more distinctly purplish; olive proximal border of distal marginal band much narrower between R^1 and R^3.——Hindwing: third discal line thinner, more even, less crenate.

Underside.——Forewing: lines SC^4—SC^5, situated halfway between fork and apex, converging behind, closer together, mostly merged together before SC^5; marginal band pointed at tip of SC^5, less widened behind R^1 than in *euryalus*, of more even width.

♂. Sexual armature as in *euryalus*, but tooth of harpe higher and carina of penis-sheath shorter.

Hab. Santo Domingo, Carabaya, S.E. Peru ; 6000 ft. ; wet and dry seasons.

In the Tring Museum 7 ♂♂, caught in November, December, January, June (Ockenden).

138. **Protambulyx sulphurea** (Pl. LXVII. f. 5. 6, ♂).

**Ambulyx eurycles* (Herr.-Schäff.) ab *sulphurea* Rothschild, Nov. Zool. i. p. 542 (1894) (Aroa ;—Mus. Tring).

♂. Forewing with the lobe SC^5 as prominent as in *eurycles* ; wings narrower, much paler, hindwings lemon-yellow.——Forewing : no large costal and internal subbasal patches, discal lines dentate also at R^2, a faint pinkish tint in basal half, especially before SM^2 ; marginal double band much narrower than in *eurycles* between R^1 and R^3.——Hindwing : second and third lines thin, third curved as in *euryalus*.

First discal line of forewing *below* close to cell, marginal band narrowed to a point below extremity of SC^5, much narrower between R^1 and R^3 than in *eurycles*, measuring only 4½ mm. at the widest point.

♂. Eighth sternite (Pl. XXII. f. 21) mesially produced into a very small lobe, which is convex, the edges being turned internad. Tenth sternite with a much narrower lobe than in *eurycles*, mesially sinuate (Pl. XXIII. f. 4). Friction-patch of clasper as in *eurycles* ; harpe different, armed with a high, erect, submesial process which is hollowed out proximally and rounded at the apex (Pl. XXXI. f. 3). Penis-sheath with a dorso-lateral ridge which has the appearance of a ribbon fastened to the sheath with one edge, the free edge of the ridge minutely notched ; distally the ridge is continued along the edge of the sheath (Pl. XXX. f. 18).

♀ and early stages not known.

Hab. South America : Venezuela.

In the Tring Museum 2 ♂♂ from Aroa, Venezuela.

139. **Protambulyx astygonus** (Pl. LXVII. f. 1. 2, *type*).

**Ambulyx astygonus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 188. n. 10 (1875) (Brazil ;—coll. Charles Oberthür) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 630 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 675. n. 9 (1892) ; Bönningh., *Iris* xii. p. 115. n. 18 (1899) (Rio de Janeiro).

♂. Close to *A. goeldii*.—— Forewing, above, without distinct stigma ; third discal line of hindwing regularly crenate, first line S-shaped, much more curved than in *goeldii* and more proximal, second almost absent or very thin.——Hindwing less pointed, distal margin more convex ; distal marginal band of forewing below halfmoon-shaped from tip of SC^5 to beyond M^1, then linear, the posterior portion thinner than in *goeldii*.

Eighth sternite with a prominent mesial process, which is, however, much shorter than in *strigilis*. Friction-patch of clasper narrow, elongate bean-shaped, obliquely longitudinal. Tooth of harpe long, obtuse, almost vertical on the clasper. Penis-sheath with a short tooth pointing sinistro-laterad. Tenth sternite short, very broad, widest at apex, which is shallowly sinuate, angles rounded, projecting laterad.

Hab. Brazil.

In the Tring Museum 1 ♂ from Rio de Janeiro.

140. **Protambulyx goeldii** spec. nov. (LXVII. f. 3. 4, ♂ ♀).

♂ ♀. Upperside of body buffish grey, silky, a green band before antennae; pronotum slightly edged with green, posterior two-thirds of mesothoracic tegula olive-green, this colour extending backwards over mesonotum and occupying metanotum; abdomen with oblique yellow-olive-green side-bands, eighth tergite olive-green, except fringe. Underside ochreous, palpus near tip and forebreast anteriorly olive-green, upperside of tibiae and tarsi grey, outer lateral surface of midtibia and -tarsus greenish brown.

Wings, *above*.——Forewing: silky buffish grey; in shape similar to that of *astygonus*, markings olive-green (costal ones partly faded into ochraceous), eight or more feeble costal bars from base to apex of cell, the interspaces partly filled in with olive at costal margin, a costal patch a little way beyond tip of cell, sharply limited behind by R^1, gradually fading away distally; between fork and apex a similar patch bordered by SC^5, along which the colour extends to outer margin, a subapical costal triangular spot an oblique subbasal band twice as long as broad, from (SM^1) to inner margin, a narrower band between SM^2 and inner margin, with which it stands at right angles before middle, a nearly semicircular large patch upon the inner margin between middle and distal angle, reaching nearly M^1, consisting of blackish markings behind, and being green before M^2; a brown apical semicircle SC^1—SC^5, a brown submarginal line from tip of SC^5 to tip of SM^2, broadly bordered proximally with greenish olive, marginal space between band and edge of wing purple brown; a large ovate blackish stigma, a straight line behind SC^{1-5} just proximal of fork, a deeply curved very faint line R^1—R^3 behind it, a little more proximal, a trace of another similar line nearer cell, and between this line and cell a broader line shining through from below; traces of two lines in front of second inner marginal band as prolongations of the respective costal bars.—— Hindwing: maize yellow, grey at base and abdominal margin, in ♀ shaded with tawny; apex acute, distal margin faintly concave in front, more obviously so behind; a straight, dentate, brown line shaded a little with ochraceous, about 1½ mm. outside cell at R^3, ending behind in a spot, a thin brown line between it and marginal band, faintly broken, evenly curved in front, a brown marginal band sharply defined, less so at apex of wing; an anal submarginal band confluent with it.

Underside similar to upperside of hindwing, bright maize yellow, shaded with tawny in ♀; stigma vestigial; a tawny brown line outside cell obtusely angulate at R^3, rather heavy in front, where it is deeper brown; R^1 and outer half of SC^5 brown; a very broad brown marginal band pointed at tip of SC^5, and linear from M^1 backwards.——Hindwing: first discal line in position as above, curved in front, a postdiscal line as above, but there are traces of other lines between the two; marginal band shaded with grey, in ♂ almost restricted to extreme edge and purple brown in colour, more distinct in ♀.

♂. Sexual armature similar to that of *astygonus*, but friction-patch broader, tooth of harpe strongly pointed, tenth sternite less broad.

Hab. Para (Dr. Goeldi).

One ♂ in the British Museum. Several specimens in the Museum at Bern, June and July.

Differs from *astygonus* in the presence of a large stigma on the forewing, in

the straighter distal edge of the hindwing, the less curved first discal line, the absence of the second line, and the not obviously dentate third line of the same wing, as well as in the more gradually narrowed distal border of the forewing below.

141. **Protambulyx strigilis** (Pl. LXVII. f. 11, ♂).

Sphinx strigilis Linné, *Mant. Plant.* p. 538 (1771) (America); Drury, *Illustr. Ex. Ent.* i. p. 62. t. 28. f. 4 (1773) (Jamaica); Fabr., *Syst. Ent.* p. 539. n. 10 (1775); Müll., *Natura Suppl.* p. 302. n. 48 (1776); Cram., *Pap. Exot.* ii. p. 14. t. 106. f. B (1777) (Curaçao; Jamaica); Goeze, *Ent. Beytr.* iii. 2. p. 204. n. 4 (1780); Fabr., *Spec. Ins.* ii. p. 144. n. 22 (1781); id., *Mant. Ins.* ii. p. 95. n. 25 (1787); Gmel., *Syst. Nat.* i. 5. p. 2377. n. 66 (1790); Fabr., *Ent. Syst.* iii. 1. p. 364. n. 26 (1793) (St. Cruz); Drury, ed. Westw., *Illustr. Ex. Ent.* i. p. 57 t. 28. f. 4 (1837).

Pholus strigilis, Hübner, *Verz. bek. Schm.* p. 134. n. 1437 (1822).

Ambulyx strigilis, Walker, *List Lep. Ins. B.M.* viii. p. 121. n. 1 (1856) (Rio de Jan.; Para; St. Domingo); Burm., *Sitzber. Naturf. Ges. Halle* iii. p. 70. n. 1 (1856); Luc., in Sagra, *Hist. Cuba* vii. p. 291 (1856); Ménétr., *Enum. Corp. Anim. Petr., Lep.* p. 93. n. 1551 (1857) (Jamaica); Clem., *Journ. Acad. Nat. Sci. Philad.* iv. p. 152. n. 40 (1859); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 175. n. 1 (1862); Herr.-Sch., *Correspbl.* iii. p. 57 (1865); Grote, *Proc. Ent. Soc. Philad.* v. p. 64 (1865) (Cuba); id. & Rob., *ibid.* p. 159. n. 64 (1865); Grote, ibid. vi. p. 329 (1867) (Cuba); id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1870) (Cuba); Boisd., *Spec. Gén. Lép. Hét.* i. p. 186. n. 7 (1875); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 347 (1876) (Surinam); Butl., *Trans. Zool. Soc. Lond.* ix. p. 579. n. 1 (1877) (Haiti; Para; Rio de Jan.); Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico); Butl., *Trans. Ent. Soc. Lond.* p. 39. n. 1 (1878) (Amazons); id., *Proc. Zool. Soc. Lond.* p. 483. n. 55 (1878) (Jamaica); Gundl., *Contr. Ent. Cubana* p. 184 (1881) (larva on *Comocladia*, *Erythroxylon*); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 16. n. 1 (1881) (Panama; S. Domingo; Rio de Jan.); Kirby, *Cat. Lep. Het.* i. p. 675. n. 6 (1892); Druce, *l.c. Suppl.* 399 (1896) (Jalapa; Coatepec; Orizaba; Guatemala; Costa Rica); Pitt. & Biol., *Lep. Het. Costa Rica* p. 11 (1897); Bönningh., *Iris* xii. p. 115. n. 16 (1899) (Rio de Janeiro; larva on *Anacardium*, *Spondia*); Kaye, *Trans. Ent. Soc. Lond.* p. 138 (1901) (Trinidad).

Ambulyx strigilis var. *rubripennis* Butler, *l.c.* ix. p. 579. sub n. 1 (1877) (Haiti).

Ambulyx rubripennis, Kirby, *l.c.* p. 675. n. 7 (1892).

♂ ♀. The lobe SC^5 of the forewing is less prominent than the apical lobe. The greenish olive spots in the basal half of the forewing are variable in size and distinctness. The third line of the hindwing is either angled at R^2 as in *eurycles*, or rounded as in *astygonus* and *euryalus*, with intergradations: the second line is occasionally absent or vestigial, while in other individuals a fourth line appears outside the third. The tawny speckles of the underside are sometimes numerous; such speckles appear not rarely also above, where they become occasionally so dense that the hindwing is altogether tawny with the bands not distinct. Individuals like these occur among *strigilis* on the continent as well as on the islands, and do not represent a local race; they are ab. *rubripennis*. End of antenna see Pl. LX. f. 4.

♂. Eighth sternite (Pl. XXII. f. 18) mesially produced into a *long* and sharply pointed process, which curves gently upwards. Lobe of tenth sternite broad and short (Pl. XXIII. f. 5), shallowly emarginate. Patch of friction-scales of clasper (Pl. LVIII. f. 30) narrow, elongate bean-shaped; harpe (Pl. XXXI. f. 4) with a rather high submesial process (*pm*), the edge *md* also somewhat raised. Penis-sheath (Pl. XXX. f. 19) resembling that of *eurycles*, but the apical ridge less evenly curved, with a larger tooth proximally. Friction-scales of eighth tergite see Pl. LVIII. f. 40.

♀. Eighth tergite sinuate; scaled. Vaginal plate (Pl. XV. f. 11) truncate distally, the postvaginal part short, with transverse ridges or folds; anterior edge of orifice raised, even, incrassate.

Early stages not known, at least not described ; larva on *Anacardium*, *Spondia*, *Erythroxylon*, *Comocladia*, etc.

Hab. Cuba to Mexico, southward over the continent and the West Indian Islands to Southern Brazil ; not known from Argentina, but occurring doubtless in the northern parts of the Republic.—Common.

In the Tring Museum 100-odd specimens from : Jamaica ; Cuba ; Haiti ; St. Vincent ; Mexico southward to Rio de Janeiro.

142. **Protambulyx carteri** spec. nov (Pl. LXVI. f. 3 ; LXVII. f. 12, ♂).

♂. Agrees structurally with *A. strigilis* ; but differs in the following points : oblique lateral lines of abdominal tergites and lines of sternites absent or very faint. Wings, *upperside*.——Forewing broader, apex less deeply sinuate ; disc with one line only, beginning at olive costal patch which stands between cell and subcostal fork, a second discal line barely traceable ; no submarginal line and no marginal band, but extreme edge of wing purple-brown.——Hindwing tawny as in ab. *rubripennis* of *strigilis* ; traces of two discal lines, the intermediate line being absent, brown marginal band vestigial in upper half, rather better marked behind.

Underside of wings very uniform in colour, similar to upperside of hindwing ; first discal line vestigial on both wings, no other markings ; forewing somewhat yellowish at base behind cell.

Hab. Bahamas and Florida.

In the Tring Museum 1 ♂ from Nassau, Bahamas, caught by Sir Gilbert Carter, in whose honour the species is named. A second ♂ from Biscayne Bay, Florida, sent for identification by the Kny-Scheerer Company.

We are not sure that this insect is distinct ; it may be a subspecies of *strigilis* ; but as the latter occurs all over the West Indies and Central and South America, without being split up into geographical races, it would be very remarkable if (and is surely not probable that) it forms a special geographical race on the Bahamas and in Florida. We expect *strigilis* to occur in these localities as well, and believe that *carteri* is independent of it. The absence of structural differences is no proof of the two being specifically the same. In *Amplypterus gannascus* and *ypsilon* we do also not find structural differences.

XLV. AMPLYPTERUS.—Typus : *gannascus*.

Sphinx Stoll (*non* Linné, 1758), in Cram., *Pap. Exot. Suppl.* p. 157 (1790).
Amplypterus Hübner, *Verz. bek. Schm.* p. 133 (1822) (partim ; type : *gannascus*).
Ambulyx Walker, *List Lep. Ins. B. M.* viii. p. 121 (1856) (partim ; type : *strigilis*).
Amblypterus (!), Smith, *Trans. Amer. Ent. Soc.* xv. p. 60 (1888).

Differs from *Protambulyx* as follows :

♂ ♀. Frons almost vertical, forming an obtuse angle with the terminal surface of the palpi, the latter projecting more than in *Protambulyx*. Antenna longer and stouter, end-segment *short*, barely twice as long as basally high, compressed, obtuse, with a brush of long scales which project far beyond the end of the segment, no long sensory bristles on end-segment, but ciliae long and densely together. All tibiae much shorter than the respective first tarsal segments, with or without

spines ; spurs *long*, almost equal, long terminal one of hindtibia nearly as long as the tibia, or longer. Lobe SC^5 of forewing more prominent ; R^2 of hindwing in or before centre of cell. Eighth sternite (♂) simply sinuate mesially ; friction-patch of clasper large (Pl. LVIII. f. 29) ; sternites without spinules.

Larva long and slender, head strongly triangular, horn very long, slightly curved upwards ; granulose, a dorsal lateral and an interrupted ventro-lateral longitudinal line yellow ; seven white side-bands, bordered red in front ; white dorsal marks on segments 4 to 10.—Food-plant : not known, probably *Oreodaphne*.

Pupa with tubercles on head ; tongue-case ?

Hab. Tropical and Subtropical America.

Seven species.—The submarginal line of the forewing, if present, begins at SC^5, not at the tip of the wing ; the discal lines of luniform bars are not obviously curved costad in front. The posterior two-thirds of the mesothoracic tegula are entirely occupied by a dark olive-green patch. The first tergite of the abdomen is not concolorous with the rest of the abdomen. A lateral spot at the angles of the frons white or grey like the terminal surface of the palpi.

The seven species fall into two well-defined groups according to the tibiae being spinose or not.

Key to the species :

a.	Fore- and midtibiae *not* spinose	*b.*
	Fore- and midtibiae spinose.	*e.*
b.	Forewing below with large black patches or bands in basal third	*c.*
	Forewing below without large black patches or bands in basal third	*d.*
c.	Subbasal band of forewing above at least 3 mm. distant from basal dot . .	143. *A. gannascus.*
	Subbasal band of forewing above touching basal dot at SM^2	144. *A. ypsilon.*
d.	Subbasal band of forewing interrupted . .	145. *A. palmeri.*
	Subbasal band of forewing not interrupted .	146. *A. eurysthenes.*
e.	Forewing with a continuous line from apical third of costa to middle of inner margin.	149. *A. donysa.*
	Forewing without such line	*f.*
f.	Hindwing above ochraceous yellow . .	147. *A. tigrina.*
	Hindwing above rosy red	148. *A. sexoculata.*

1. Fore- and midtibiae not spinose ; long terminal spur of hindtibia as long as the tibia, or longer. Abdomen with a series of dorsal mesial spots.

143. Amplypterus gannascus.

Sphinx gannascus Stoll, in Cram., *Pap. Ex. Suppl.* p. 157. t. 35. f. 3 (1790) (*Cap. b. spei* ! !).
Amplypterus gannascus (!), Hübner, *Verz. bek. Schm.* p. 133. n. 1429 (1822).
Ambulyx gannascus, Walker, *List Lep Ins. B. M.* viii. p. 121. n. 2 (1856) (partim ; Amazon ; Guatemala ; Jamaica) ; Clem., *Proc. Ac. Nat. Sci. Philad.* iv. p. 153. n. 41 (1859) (S. Am. ; Mex. ; W. Ind.) ; Morris, *Cat. Lep. N. Am.* p. 20 (1860) (syn. partim) ; Clem., in Morris, *Syn. N. Am. Lep.* p. 175. n. 2 (1862) ; Herr.-Sch., *Corresp.* iii. p. 57 (1865) (Cuba) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 64 (1865) ; Boisd., *Consid. Lép. Guatemala* p. 68 (1870) ; Gundl., *Contr. Ent. Cubana* p. 185 (1881) ; Bönningh., *Iris* xii. p. 116. n. 20 (1899) (Rio de Jan.).

Ambulyx gannascus, Burmeister, *Sitzber. Naturf. Ges. Halle* iii. (Separ.) p. 15. n. 2 (1856) (N. Friburgo ; descr. of genus, larva and pupa) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 159. n. 63 (1865) (trop. insul. distr.) ; Grote, *ibid.* v. p. 329 (1867) (Cuba) ; id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1870) (Cuba) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 183. n. 3 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 581. n. 15 (1877) (Jamaica) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 16. n. 2 (1881) (Guatemala ; Nicaragua ; Chiriqui ; Jamaica) ; id., *l.c., Suppl.* p. 309 (1896) (Mexico ; Guatemala ; Costa Rica) ; Burm., *Descr. Rép. Argent.* v., *Atlas.* p. 34. t. 13. f. 5 (*l.*). 8 (*p.*). (1879) ; Kirby, *Cat. Lep. Het.* i. p. 676. n. 33 (1892) ; Pitt. & Bioll., *Lep. Het Costa Rica* p. 12 (1897).

Ambulix (!) *gannascus*, Ménétriés, *Enum. Corp. Anim. Petr., Lep.* p. 93. n. 1552 (1857) (Brazil).

**Ambulyx rostralis* Boisduval, *Cons. Lép. Guatemala* p. 68 (1870) (Nicaragua ; N. Granada) ; Feld., *Reise Novara, Lep.* t. 77. f. 6 (1874) (Mus. Tring) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 184. n. 4 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 581. n. 16 (1877) ; Druce, *l.c.* n. 3 (1881) (Nicaragua ; Colombia ; Ecuador ; Amazon ; Brazil) ; Kirby, *l.c.* n. 36 (1892) ; Pitt. & Bioll., *Lep. Het. Costa Rica* p. 10 (1897).

Ambulyx janus Boisduval, *Cons. Lép. Guatemala* p. 68 (1870) (sub syn.).

**Ambulyx daphne* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 184. n. 5 (1875) (Brazil ;—coll. Charles Oberthür) ; Kirby, *l.c.* n. 34 (1892).

Ambulyx sexoculata, Butler (*non* Grote, 1867), *Trans. Zool. Soc. Lond.* ix. p. 582. n. 22 (1877) (Guatemala) ; Druce, *l.c.* p. 17. n. 4 (1881) (Guatemala) ; Rothsch., Nov. Zool. i. p. 542 (1894) (Costa Rica).

♂ ♀. The species is very variable in the general tint of the forewing as well as in the extent of the black bands of the hindwing ; the extreme individuals are connected by all intergradations. The black bands of the hindwing are not rarely widened and joined along the nervures to each other and to the marginal band, the outer half of the wing in this case appearing black with three rows of red spots. The submarginal black band is sometimes so broad that there is little left of the external row of red spots ; on the other hand, the band is often reduced to small vein-spots. The second black band is occasionally very narrow. End of antenna see Pl. LX. f. 6.

♂. Tenth tergite (Pl. XXIII. f. 2. 3) widened at the end and rounded horizontally, appearing pointed in side-view ; sternite sinuate, the angles rounded. Harpe (Pl. XXXI. f. 5) not much raised above the plane of the clasper, varying somewhat individually, especially the submedian ridge, which is occasionally very indistinct ; distal process flat upon the clasper, not projecting beyond the ventral edge of the latter. Penis-sheath (Pl. XXX. f. 15) destitute of hooks and teeth ; a rounded, rod-like carina running up to the tip, where it turns internad, being continued on the inner side of the sheath. Friction-patch see Pl. LVIII. f. 29.

♀. Eighth tergite rather broadly sinuate. Vaginal plate longitudinally concave behind orifice, very slightly chitinised, latero-distal edges more strongly chitinised ; a fold in front of the orifice.

Larva yellowish pale green, a yellow dorso-lateral line, white X-shaped dorsal markings, except on segments 1 to 3 ; seven white oblique side-bands with a red frontal border, segments 4 to 11 with a longitudinal yellow ventro-lateral stripe.—Food-plant : not known ; probably *Oreodaphne*.

Hab. Southern Brazil to Mexico, Cuba, Jamaica. Apparently rare in the Andes of Ecuador, Peru, and Bolivia.

In the Tring Museum 120-odd specimens from : Mexico to Peru ; Venezuela to Rio de Janeiro.

144. **Amplypterus ypsilon** spec. nov.

♂ ♀. Body beneath rather redder and at sides of sterna more green than in *gannascus*.

Wings, *upperside*.——Forewing rather broader than in *gannascus*, differently marked: subbasal band broad, almost extended to the very base of the wing, touching the basal dot at SM^2, the interspace between this dot and the band and nervure M scarcely larger than the dot itself; the band is preceded before M by a detached patch, which stands a little more distal and is edged all round with greyish white; the patch does not reach the costal margin; the grey scaling on the disc mostly divided up into 3 to 5 series of narrow lunules; discal spot M^1—M^2 smaller than in *gannascus*, subapical patch much larger, being of the same size as in *curysthenes*; vein R^1 brown; distal marginal area much more extended olive-brown than in *gannascus*.——Hindwing also broader than in *gannascus*: median band 3½ to 4 mm. broad, not obviously dentate upon the veins; discal band merged together with the postdiscal one, being separated from it only in front; this disco-postdiscal band—resembling the letter Y—is not dentate, the veins not being black as in the specimens of *gannascus* with broad bands; the interspace between this band and the dark edge of the wing tawny olive, becoming rosy red at costal margin.

Underside.——Forewing: the red colour of the basal area merges on the disc gradually into the brown or ochraceous colour of the outer area of the wing, while in *gannascus* the red area is more or less sharply defined discally; subbasal band nearer the base than in *gannascus*, discal brown patch M^1—M^2 small, grey outer marginal area much wider than in *gannascus*, including a broad burnt umber-brown band.——Hindwing obviously shaded with grey, a discal and a postdiscal continuous line of red lunules, the outer one indistinct in ♂ and followed by an ill-defined grey line.

♂. Sexual armature as in *gannascus*, but tenth sternite less sinuate; the patch of modified scales on the clasper is brown, except the most dorsal portion, which is yellow.

Length of forewing: ♂, 56 mm.; ♀, 70 mm.

Breadth of forewing: ♂, 21 mm.; ♀, 26 mm.

Hab. Costa Rica to Ecuador.

In the Tring Museum 1 ♂, 2 ♀♀ from Costa Rica (Underwood; M. de Mathan); type ♂.

In coll. Charles Oberthür 1 ♂ from Balsapampa, Ecuador (M. de Mathan); also in coll. Druce; in coll. Staudinger from Chiriqui; in the Oxford Museum from Nicaragua.

145. **Amplypterus palmeri.**

Ambulyx gannascus, Walker (*non* Stoll, 1790), *List Lep. Ins. B.M.* viii. p. 121. n. 2 (1856) (partim; Rio de Jan.).

**Ambulyx palmeri* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 181. n. 1. t. 4. f. 3 (♂) (1875) (Brazil;—coll. Charles Oberthür); Butl., *Trans. Zool. Soc. Lond.* ix. p. 630 (1877); Kirby, *Cat. Lep. Het.* i. p. 677. n. 39 (1892); Bönningh., *Iris* xii. p. 116. n. 21 (1899) (Rio de Jan.).

**Ambulyx marginata* Butler, *Proc. Zool. Soc. Lond.* p. 10 (1875) (Rio de Jan.;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 581. n. 17 (1877); Kirby, *l.c.* p. 677. n. 41 (1892).

♂♀. Forewing above with a straight or feebly curved line from upper angle of cell to inner margin, which it reaches a little beyond basal fourth. Hindwing with a broad blackish brown distal border. Size of the olive-green markings variable. Sexual armature not essentially different from that of *gannascus*, the submesial ridge of the harpe rather higher, the tenth sternite almost truncate, very

feebly sinuate, tenth tergite slenderer, especially apically in dorsal view. Vaginal plate with the anterior edge of the orifice rather more strongly chitinised.

Early stages not known.

Hab. South America, from Sta. Catherina to Colombia and Venezuela.

In the Tring Museum 7 ♂♂, 4 ♀♀ from: Sta. Catherina; Rio de Janeiro; Santo Domingo, Carabaya, S. E. Peru, 6000 ft., June 1902, dry season (Ockenden): Rio Dagua, Colombia (Rosenberg); Aroa, Venezuela.

In coll. Staudinger also from Manaos.

146. Amplypterus eurysthenes.

**Ambulyx eurysthenes* Felder, *Reise Novara, Lep.* t. 77. f. 5 (1874) (Colombia;—Mus. Tring); Boisd., *Spec. Gén. Lép. Hét.* i. p. 185. n. 6 (1875) (Colombia); Butl., *Trans. Zool. Soc. Lond.* ix. p. 581. n. 18 (1877); Kirby, *Cat. Lep. Het.* i. p. 675. n. 18 (1892).

**Ambulyx erethon* Boisduval, *l.c.* p. 182. n. 2 (1875) (Peru or Bolivia;—coll. Charles Oberthür); Butl., *l.c.* p. 630 (1877); Kirby, *l.c.* p. 677. n. 40 (1892).

**Ambulyx schausi* Rothschild, Nov. Zool. i. p. 87 (1894) (Petropolis;—Mus. Tring).

♂♀. The line crossing the forewing between M^1 and M^2 is irregular and much less oblique than the corresponding line of *palmeri*, being behind at least 5 mm. distant from the subbasal band, while at the costal margin the band is more proximal than in *palmeri*. Hindwing with a blackish brown distal marginal band. Genital armature as in *palmeri*.

Early stages not known.

Hab. Espirito Santo to Colombia.

In the Tring Museum 1 ♂, 2 ♀♀ from: Colombia (*type* of *eurysthenes*); Petropolis (*type* of *schausi*); Espirito Santo.

147. Amplypterus tigrina.

**Ambulyx tigrina* Felder, *Reise Novara. Lep.* t. 77. f. 4 (1874) (Venezuela;—Mus. Tring); Boisd., *Spec. Gén. Lép. Hét.* i. p. 187. n. 8 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 518. n. 14 (1877); Kirby, *Cat. Lep. Het.* i. p. 677. n. 38 (1892).

♂♀. The upperside of the body and forewing of the type is less brown than in fresh specimens.——The underside of the hindwing bears distally of the cell a prominent, nearly straight, black or brown line.

♂. The submesial ridge of the harpe is much higher than in *gannascus*, the ventral part of the harpe scarcely so distinct as in that species; the penis-sheath is not essentially different; the apex is dorsally more strongly chitinised than ventrally; the feebly raised rounded carina which appears in *gannascus* as a dark line is not marked except at the end. The tenth tergite is vertically broader in and beyond the middle than in *gannascus*; the sternite is less sinuate.

Hab. Venezuela; Colombia; Ecuador.

In the Tring Museum 5 ♂♂, 2 ♀♀ from: Colombia; Loja, Ecuador.

In coll. Dognin 2 ♀♀ from Loja.

148. Amplypterus sexoculata.

Ambulyx sexoculata Grote, *Ann. Lyc. N. York* viii. p. 204 note (1867) (Brazil); Kirby, *Cat. Lep. Het.* i. p. 676. n. 28 (1892).

**Ambulyx depuiseti* Oberthür, *Et. Ent.* vi. p. 31. t. 5. f. 3 (1881) (Colombia;—coll. Charles Oberthür).

Grote's description of *sexoculata* applies to the present species. Butler and Druce, not being acquainted with this insect, identified specimens of *gannascus* as *sexoculata*, and Rothschild made the same mistake (see *gannascus*).

♂. The harpe is scarcely as much raised above the plane of the clasper as in *gannascus*; the submesial ridge is especially low. The rod-like carina of the penis-sheath is apically rather prominent; there is apparently no internal cariniform thickening of the penis-sheath. The tenth sternite is shaped as in *tigrina*, the tergite as slender as in *palmeri*.

Hab. Venezuela; Colombia; Ecuador; Peru; Bolivia.

In the Tring Museum 8 ♂♂, 2 ♀♀ from: Merida, Venezuela (Briceno); Bogota (town), at electric light, December (Bürger); Santo Domingo, Carabaya, S.E. Peru, 6000 ft., vi. xi., dry and wet seasons (Ockenden).

In coll. Staudinger also from Chaco, Bolivia, 2000–3000 m. (Garlepp).

149. **Amplypterus donysa.**

**Ambulyx donysa* Druce, *Ann. Mag. N. H.* (6). iv. p. 78 (1889) (Jalapa); Kirby, *Cat. Lep. Het.* i. p. 676. n. 35 (1892); Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 309. t. 66. f. 7 (1896) (Jalapa; Orizaba; Guatemala; Chiriqui).

♂♀. The ♂ is much more strongly marked than the ♀, in which the undulated and dentated lines of the forewing are only vestigial or even absent. The most distal line is proximally convex between the veins down to R^3, while from R^3 to M^2 the internervular portions are proximally concave; the same is the case in the two preceding species, where the lines are, however, very faint as a rule. Individually variable.

♂. Sexual armature similar to that of *gannascus*; penis-sheath simply truncate at the end, not more strongly chitinised dorsally than laterally and ventrally, no kind of dorsal process or carina. Tenth sternite broader basally than in *gannascus*, more evenly rounded apically, with just a trace of a mesial sinus, more extended spiny than in the other species of *Amplypterus*.

♀. Vaginal plate (Pl. XV. f. 10) rather more strongly chitinised than in *gannascus*, distally rounded.

Early stages not known.

Hab. Mexico to Panama.

In the Tring Museum 8 ♂♂, 3 ♀♀ from: Orizaba; Jalapa; Coatepec; Teocelo; Rosery Mines, Honduras; Chiriqui.

XLVI. ORECTA gen. nov.—Typus: *lycidas*.

Ambulyx, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 191 (1875).
Philampelus, Burmeister (*non* Harris, 1839), *Descr. Rép. Argent.* v. p. 320 (1875).

♂♀. Tongue not reaching beyond the posterior coxae, rather weak, ciliae of fringe not separate. Genal process subglobose, not reaching to tip of pilifer. Head small, frons vertical, a mesial crest, developing to a transverse crest between antennae. Eyelashes present. Palpus small, truncate, second segment broadest at end, anterior angle projecting forward (side-view), terminal surface at an obtuse angle with the frons. Antenna as long as (♂), or shorter than (♀), R^3 of forewing; end-segment short, with a brush of long scales (nearly as in *Amplypterus*); segments of ♀ with the basal ciliae very feebly prolonged. Abdomen without spinules on the sternites, but the under scales of the tergites nearly all spiniform, no broad scales on the tergites. Legs shorter than in *Amplypterus* and *Protambulyx*; tibiae not spinose,

longer than the respective first tarsal segments, which are about as long as the cell of the hindwing is broad apically ; tarsal segments 3 and 4 not twice as long as broad ; pulvillus and paronychium present, the latter with two lobes at each side, the ventral lobes broader ; foretibia *with a thorn* at the end ; spurs very short, two pairs close together on hindtibia, the longer terminal spur little longer than the tibia is broad. Wings entire, falcate, apex pointed, not sinuate between SC^1 and SC^5 ; D^3 of forewing shorter than D^4 ; R^2 of hindwing central, or a little behind centre of cell, D^2 slightly curved or straight, D^3 twice as long as D^4, lower angle of cell almost 90°, sometimes obtuse ; frenulum and retinaculum present. No friction-scales on clasper and eighth tergite.

Larva as in *Amplypterus*, with white dorso-lateral line.—Food-plant : *Oreodaphne acutifolia*.

Pupa not described in detail ; head with two tubercles, tongue-case not reaching end of wing-cases.

Hab. Subtropical Brazil ; Argentina.

One species.

A development of *Amplypterus*.

150. Orecta lycidas.

**Ambulyx lycidas* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 191. n. 15 (1875) (Brazil ;—coll. Charles Oberthür) ; Rothsch., Nov. Zool. i. p. 86 (1894) (=*tithonus*=*eos*).

♂♀. Individually variable in the markings. Frons unicolorous, except a dot at each side which is white like the terminal surface of the palpi. Mesothoracic tegula without a grey fringe posteriorly and laterally. Abdomen with a dark mesial line, which is mostly interrupted on each segment ; eighth tergite of ♂ without patch. Tibiae with a white basal spot. Hindwing, near anal angle, with a double spot of ovate scales which fall off easily, leaving the spots naked and therefore transparent.

On examining a series of specimens we come to the conclusion that the differences pointed out by Kirby (see below) between *lycidas*, *eos* and *tithonus* are not specific and not constant. But the Argentinian individuals and those from Uruguay and neighbouring districts differ on the whole somewhat from the examples found in the provinces of Rio de Janeiro and Espirito Santo, and must be kept apart as a separate subspecies until it is proved, on receipt of more material from the province of Rio, that the apparent differences are merely individual, not being met with in the greater proportion of the individuals.

♂. Eighth sternite faintly lobed mesially. Tenth segment essentially the same as in *Protambulyx* and *Amplypterus* ; sternite shallowly sinuate, sides rounded, the spinose area more extended than in *Amplypterus*. Clasper sole-shaped ; harpe (Pl. XXXI. f. 6) with a broad and rather high submesial ridge (*pm*) which inclines distad, the distal process (*pc*) very feeble, scarcely separated from the clasper. Penis-sheath (Pl. XXX. f. 20) resembling that of *Amplypterus*, the carina terminally fused with the membrane of the duct.

♀. Vaginal plate not strongly chitinised, broadly rounded distally, no special armature at orifice.

Larva : see above.

Hab. Espirito Santo to Argentina.

Two subspecies :

a. O. lycidas lycidas.

**Ambulyx lycidas* Boisduval, *l.c.* (1875) (Brazil;—coll. Charles Oberthür); Butler, *Trans. Zool. Soc. Lond.* ix. p. 630 (1877); Kirby, *Proc. Zool. Soc. Lond.* p. 271. t. 27. fig. (1886); id., *Cat. Lep. Het.* i. p. 675. n. 2 (1892); Bönniogh., *Iris* xii. p. 115. n. 19 (1899) (Rio).
**Ambulyx tithonus* Kirby, *Proc. Zool. Soc. Lond.* p. 270. n. 3. t. 27. f. 2 (1886) (Brazil;—Mus. Dublin).

♂♀. Apex of forewing strongly produced, outer margin very feebly convex between R^1 and M^2.

Hab. Espirito Santo; Rio de Janeiro; probably also Sao Paulo and Parana.

In the Tring Museum 1 ♀ without precise locality.

b. O. lycidas eos.

Philampelus eos Burmeister, *Descr. Rép. Argent.* v. p. 320. n. 4 (1875) (Buenos Ayres); Butl. *Papilio* i. p. 104 (1881) (not a *Philampelus*).
Ambulyx lycidas, Burmeister, *l.c. Atlas* p. 58. t. 10. f. 1 (♀) (1879) (descr. of larva and pupa).
Ambulyx eos, Kirby, *Proc. Zool. Soc. Lond.* p. 269. n. 2. t. 27. f. 1 (♂) (1886); id., *Cat. Lep. Het.* i. p. 675. n. 3 (1892).

♂♀. Apex of forewing less produced than in the preceding subspecies, distal margin more convex, subbasal band more oblique, subapical costal spot smaller.

Hab. Argentina and Uruguay.

In the Tring Museum 6 ♂♂, 7 ♀♀.

XLVII. TROGOLEGNUM gen. nov.—Typus: *pseudambulyx.*

Smerinthus, Boisduval (*non* Latreille, 1802), *Spec. Gén. Lép. Hét.* i. p. 29 (1875).

♂. Tongue very weak, thin, short. Palpus rough-haired, short. Head hairy, small, sunken. Eye small. Antenna strongly grooved, end-segment short. Abdominal tergites spinose all over. Tibiae *not* spinose; spurs rather long, two pairs to hindtibia, longer terminal one three-quarters the length of the first tarsal segment. Pulvillus, paronychium, frenulum and retinaticulum present. Apex of forewing sinuate, lobe SC^5—R^1 very broad, distal margins of both wings somewhat scalloped, that of forewing excised between R^1 and R^3; SC^2 and R^1 of hindwing on a rather long stalk, R^2 central or a little before centre, D^2 curved, D^3 straight, longer than D^4, lower angle of cell about 75°. Clasper without friction-scales.

♀ and early stages not known.

Hab. Mexico.

One species.

A derivation from *Amplypterus.*

151. Trogolegnum pseudambulyx.

**Smerinthus pseudambulyx* Boisduval, *l.c.* n. 18 (1875) (Mexico; "♀" ex err.;—coll. Charles Oberthür).
Ambulyx (?) *pseudambulyx*, Butler, *Trans. Zool. Soc. Lond.* ix. p. 528 (1877).
Smerinthus (?) *pseudambulyx*, Kirby, *Cat. Lep. Het.* i. p. 711. n. 8 (1892); Druce, *Biol. Centr. Amer., Lep. Het. Suppl.* p. 310. t. 58. f. 4 (1896) (Mexico).

♂. Only two specimens known, as far as we are aware; both are ♂♂. In colour the species resembles *Amplypterus donysa*; the subbasal band of the forewing

reaches, however, to costal margin. The small subcostal spot at the proximal side of the band drawn in the figure in the *Biologia* is not present in the specimen from which the figure was taken ; the artist was misled by the dark appearance of a small place from which the scales of the upper layer have mostly been removed. Tenth tergite prismatical, broader above than below (Pl. XXIII. f. 12), simple, curved, narrowed in middle, apex acute in side-view, feebly sinuate in dorsal view ; sternite short, very broad, rounded, apex shallowly sinuate, lateral and distal parts of upperside densely clothed with short bristles (*Xv*). Clasper sole-shaped, apex strongly rounded ; harpe indicated by a feeble fold separating a triangular piece from the rest of the clasper (Pl. XXXI. f. 7). Penis-sheath without processes, the dorso-lateral margin incrassate, ending apically in a rounded carina.

Hab. Mexico.

One ♂ (*type*) in coll. Chas. Oberthür, another in coll. W. Schaus.

XLVIII. COMPSOGENE gen. nov.—Typus : *panopus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* iii. p. 50 (1779).
Amplypterus Hübner, *Verz. bek. Schm.* p. 133 (1822) (partim ; type : *gannascus*).
Calymnia Walker (*non* Hübner, 1822), *List Lep. Ins. B. M.* viii. p. 124 (1856).
Amblypterus (!), Moore, *Lep. Ceyl.* ii. p. 13 (1882).

♂ ♀. Tongue strong at base, reaching middle of abdomen. Palpus large, prominent, truncate, terminal surface nearly as long as the frons in ♂, first segment strongly curved, nearly 3 mm. long in a straight line from base to tip ; second (inclusive of scaling) 5 mm. long and 3 mm. broad. Antenna of ♂ 3 mm. and of ♀ 5 mm. shorter than R^3 of forewing, end-segment prolonged, setiform, with a rather large number of bristles ; segments grooved in ♂, almost cylindrical in ♀. Abdomen with spines at the edges of the sternites as well as the tergites, but the spines of the former very weak and small. Tibiae *not* spinose, as long as, or a little longer than, the first tarsal segment ; spurs long, unequal, two pairs to hindtibia, long terminal one little shorter than first tarsal segment, hindtarsus half as long again as cell of hindwing measured along SC, end-segment (claw excluded) not longer than last but one ; pulvillus large, paronychium with two lobes at each side, upper lobe long and slender, lower lobe much broader. Distal margin of forewing entire, apex truncate-sinuate ; cell of hindwing small, not quite a third the length of the wing, measured along SC ; R^2 of hindwing before centre of cell, D^2 angled or curved. Clasper and eighth tergite with organ of friction.

Larva greyish green, with seven oblique yellowish side-bands and a yellowish subdorsal line ; granulose, head triangular, horn very long, slightly curving upwards ; colour changing before pupation into grey in ventral half and brown-red in dorsal half.—Food-plant : *Mangifera*.

Chrysalis elongate ; tongue-case reaching to end of wing-cases ; these with granules upon the veins ; tergites of abdomen rugate, a dorso-lateral series of granules, segments 4, 5, 6 laterally with several carinae anteriorly ; cremaster blunt, longitudinally rugate (in Brit. Mus.).

Hab. China, N.W. India to Ceylon, eastwards to the Philippines and Java.

One species.

152. Compsogene panopus.

Sphinx panopus Cram., *Pap. Ex.* iii. p. 50. t. 224. f. A. B. (1779) (Java).

Amplypterus panopus, Hübner, *Verz. bek. Schm.* p. 133. n. 1430 (1822) ; Kirby, *Cat. Lep. Het.* i. p. 674. n. 1 (1892).

Smerinthus (?) *panopus*, Westwood, *Cab. Or. Ent.* p. 13. t. 6. f. 2 (1848).

Calymnia panopus, Walker, *List Lep. Ins. B. M.* viii. p. 124. n. 1 (1856) (Java ; Ceylon) ; Moore, in Horsf. & Moore, *Cat. Lep. Mus. E. I. C.* i. p. 266. n. 613. t. 7. f. 6. 6a (*l.p.*) (1857) (Java) (larva on *Mangifera*, v.) ; id., *Proc. Zool. Soc. Lond.* p 675 (1867) (Silhet) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 13. n. 1 (1875) (Java ; Borneo ; Celebes ; Ceylon ; N. India) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 625 (1877) (Java ; Ceylon ; N. India ; "belongs to *Sphinginae*"!!) ; Moore, *Journ. As. Soc. Beng.* liii. 2. p. 234. n. 7 (1884) (Cachar) ; Cot. & Swinh., *Cat. Moths Ind* i p. 34. n. 186 (1887) (Silhet ; Nilgiris) ; Swinh., *Trans. Ent. Soc. Lond.* p. 165. n. 24 (1890) (Rangoon) ; Hamps., *Illustr. Typ. Specim. Lep. Het. B.M.* viii. p. 2. n. 34 (1891) (Nilgiris) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 35. n. 139 (1892) (Burmah) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 76. n. 102. fig. 48 (♀) (1892) (India ; Ceylon ; Burma ; Andamans ; Java) ; Semp., *Schm. Philipp.* ii. p. 392. n. 24. t. D. f. 5 (*l.*) (1896) (Luzon, x. xi.) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 407. n. 102 (1898) (Sikhim ; Bhutan).

**Calymnia pavonica* Moore, *Proc. Zool. Soc. Lond.* p. 596 (1877) (Pt. Blair, Andamans) ; Cot. & Swinh., *l.c.* p. 35. n. 187 (1887) ; Piep., *Tijdschr. Ent.* xl. p. 98. t. 1. f. 20. 25 (born of *l.*) (1897).

Amblypterus (!) *panopus*, Moore, *Lep. Ceyl.* ii. p. 13. t. 81. f. 1. 1a. b. c. (*l. p. i.*) (1882) ; Rothsch., Nov. Zool. i. p. 86 (1894) (=*pavonicus* ; "Amboyna" err. loc.) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 366. n. 36 (1895) (Java).

Amplypterus pavonicus, Kirby, *l.c.* n. 2 (1892).

♂ ♀. The Indian specimens are on the whole somewhat darker on the forewing than the Malayan ones, the antemedian lines of the same wing are more distinct behind the cell, the black angulated submarginal line stands closer to the margin at R^2, and the last but one line of the hindwing is a little more dentate. These differences are not constant.——The first two lines of the hindwing, above, are often all red and are sometimes not strongly marked.

♂. Eighth sternite with a spatulate mesial process about 1½ mm. long. Tenth tergite long, narrow, slightly compressed, curved downward, finger-like, not sharply pointed ; sternite produced into a mesial plate, which is a little longer than broad, with the sides almost parallel, the apex sinuate, the lobes rounded. Clasper very large, apex rounded, scales of outside short, excepting edges where they are prolonged, a large ochraceous patch of small bidentate sulcate scales, the patch rounded distally and dorsally, obliquely truncate-rounded basally ; harpe represented by a small basal ridge which stands nearly at right angles to the ventral edge of the clasper and leans distad. Eighth tergite at each side with a belt of enlarged scales on the inner surface, the belt formed by several rows of scales which are closely packed one upon the other, no scales mesially at apex of segment. Penis-sheath with a small tooth ; from the mouth project two tongue-like flaps which are beset with triangular projections bearing short bristles.

♀. Eighth tergite transverse, membranaceous at apex ; edge irregularly sinuose. Vaginal plate more or less membranaceous except the strongly rounded distal edge.

Larva and chrysalis see above.

Hab. China, N.W. and N. India south- and eastwards to Ceylon, the Andamans, Java, Borneo, the Philippines. Boisduval records it also from Celebes ; this requires confirmation.

In the Tring Museum 16 ♂♂, 17 ♀♀ from : Sikhim ; Bhutan ; Khasia Hills ; Burma ; Tonkin ; Hongkong ; Ceylon ; Andamans ; Penang, xii. (C. Curtis) ; Java ; Labuan, Borneo, ix. (A. Everett).

XLIX. BATOCNEMA gen. nov.—Typus : *cocquereli*.

Ambulyx, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 191 (1875)

♂♀. Tongue reaching basal fourth of abdomen. Palpus somewhat projecting, visible from above, rather narrow, end-surface much smaller than in *Protambulyx* and allies, second segment longer than first. Antenna about 2 mm. shorter than R^3 of forewing : end-segment conical, about two and a half times as long as basally high, with the scales forming a longer tuft. Abdominal sternites without spines. Tibiae not spinose, rather shorter than the respective first tarsal segments ; foretibia ending in a long *thorn* ; spurs very unequal, two pairs to hindtibia, long terminal one as in *Compsogene* about one-sixth shorter than the first tarsal segment ; pulvillus and paronychium present, the latter with two slender lobes at each side. Discal margins of wings entire ; apex of forewing truncate-sinuate between SC^4 and SC^5 ; D^3 as long as, or longer than, D^4 ; D^2 of hindwing curved or angled, R^2 central or below centre, D^3 longer than D^4. Clasper and eighth tergite with friction-scales.

Larva not known.

Hab. Madagascar, Comoro Islands, and East Africa.

Two species.

Nearest to *Compsogene*.

Key to the species :

Forewing above with four costal olive patches, the third at subcostal fork elongate, reaching to R^3	153. *B. cocquereli*.
Forewing above with two costal olive patches, the second and third being scarcely traceable	154. *B. africanus*.

153. Batocnema cocquereli.

**Ambulyx cocquereli* Boisduval, *l.c.* t. 4. f. 2 (1875) (Nossi-bé ;—coll. Charles Oberthür).

♂♀. The two subspecies of this peculiar insect differ in the shade of the ground-colour, the shape of the wings, and the form of the tenth abdominal sternite (♂).

♂. Eighth sternite mesially minutely sinuate, the edge of the segment being mesially bent inward. Tenth tergite long, slender, strongly compressed, pointed, curved ; sternite nearly as in *Protambulyx sulphurea* (Pl. XXIII. f. 4), angles rounded, apex entire or sinuate. Clasper sole-shaped, apical edge strongly concave basally ; patch of friction-scales longitudinal, elongate-halfmoon-shaped (Pl. LVIII. f. 33), the scales minute, bidentate ; harpe short, distally raised into an obliquely transverse ridge (Pl. XXXI. f. 8). Penis-sheath similar to that of *Amplypterus gannascus*.

♀. Not dissected.

Hab. Madagascar and Comoro Islands.

Two subspecies :

a. B. cocquereli cocquereli.

**Ambulyx cocquereli* Boisduval, *l.c.* ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 630 (1877) ; Mab., *Ann. Soc. Ent. France* p. 296 (1879) (Nossi-bé ; S.W. Coast) ; Saalm., *Lep. Mad.* i. p. 124. n. 297. t. 3. f. 39 (1884) (Nossi-bé ; S.W. Coast) ; Kirby, *Cat. Lep. Het.* i. p. 677. n. 46 (1892).

♂♀. Underside of wings and body maize yellow with a tint of sulphur ; upperside of hindwing chrome yellow, pale parts of upperside of forewing, of head,

thorax and abdomen, and the upperside of the tibiae and tarsi deep cream-colour. Tenth abdominal sternite more or less sinuate.

Hab. Madagascar ; apparently all over the island in suitable districts.

In the Tring Museum 8 ♂♂ from : Antanosy country, S. Mad. (Last) ; and "Madagascar."

b. B. cocquereli comorana subsp. nov.

♂. Wings shorter and broader than in the Madagascar form, hinder angle of forewing more obtuse. Pale parts of upperside of body buff, distinctly vinaceous, the same colour before middle of forewings, the ground colour of the forewing buff yellow ; hindwing and underside orange. Large costal patch situated at basal fourth smaller than in the preceding subspecies, the triangular costal band proximal of fork more oblique and slightly curved, brown submarginal line less curved, almost straight from SC^5 to M^1. Tenth abdominal sternite not sinuate.

Hab. Great Comoro I.

In the Tring Museum 5 ♂♂.

154. **Batocnema africanus.**

**Polyptychus africanus* Distant, *Ann. Mag. N. H.* (7). iii. p. 179 (1899) (Lydenburg distr., Transvaal;—coll. Distant) ; id., *Ins. Transv.* t. 3. f. 4 (1902).

♂. Wings, *upperside.*——Forewing : olive-green basal patch larger than in *cocquereli*, no line beyond first costal patch, second costal patch at end of cell and third at subcostal fork absent or vestigial, subapical patch larger than in *cocquereli* ; line from lower angle of cell backwards more oblique ; costal margin feebly concave in proximal half, anal angle more produced distad than in the preceding.—— Hindwing : a short and sharply defined olive band from anal angle to beyond M^2, no lines.

A specimen in the Berlin Museum from Ukami, Mandera, v.—viii. 1894 (Stuhlmann), differs from Distant's type in some details ; it may represent a northern subspecies, but as it has no abdomen and the thorax is rubbed, we abstain from giving a description.

Not dissected.

Early stages and ♀ not known.

Hab. East Africa : Transvaal ; German E. Africa.

L. AKBESIA gen. nov.—Typus : *davidi.*

Smerinthus, Oberthür (*non* Latreille, 1802), *Bull. Soc. Ent. France* p. 12 (1884).

♂♀. Tongue reaching beyond middle of abdomen, mesial fringe fused to form a membrane, but the ciliae traceable. Palpus short, narrow, not produced beyond frons, second segment not longer than first. Genal process projecting beyond tip of pilifer. Antenna 2 or 3 mm. longer (♂), or 1 mm. shorter (♀), than R^3 of forewing ; segments cylindrical in ♀, not grooved, without prolonged ciliae, antenna thickest beyond middle ; in ♂ grooved, with long ciliae, ventral outline of segments (side-view) straight ; distal segments very short in both sexes, end-segment also very short, rounded in side-view, with a brush of long scales. Eye-lashes short, but distinct. Head with transverse crest between antennae. Abdominal

tergites densely spinulose at the edges ; sternites with very few, long and weak, spinules. Tibiae *not* spinose ; foretibia ending in a long *thorn*, shorter than first tarsal segment (thorn excluded), spur of foretibia long, nearly reaching end ; mid- and hindtibia longer than first tarsal segment ; *two* pairs of spurs to hindtibia, longer terminal spur about one-third the length of the first tarsal segment ; pulvillus small, paronychium with two very short lobes at each side, the ventral lobes merely vestigial. Distal margins of wings slightly scalloped ; R^2 of hindwing central, D^2 somewhat angled, D^4 half the length of D^3, SC^2 and R^1 on a stalk. Frenulum and retinaculum present. Clasper and eighth sternite without organ of friction ; eighth sternite simple (♂).

Larva and pupa not described.

Hab. Akbès, Syria.

One species.

155. **Akbesia davidi.**

**Smerinthus davidi* Oberthür, *l.c.* (Akbès ;—coll. Charles Oberthür) ; id., *Et. Ent.* ix. p. 29. t. 2. f. 6 (1884).

Darapsa (?) *davidi*, Kirby, *Cat. Lep. Het.* i. p. 671. n. 9 (1892) (As. min.).

♂ ♀. The long series of specimens which we have seen did not exhibit much individual variation. The hindwing is in some individuals paler yellow than ordinarily. The nearest relatives of this fine Sphinx are the species of the genus *Batocnema* from East Africa and Madagascar.

♂. Tenth tergite long, narrowed to a finger-like process, which is pointed and somewhat compressed ; sternite produced into a broad mesial plate, which is broadly sinuate, with the rounded lobes slightly projecting laterad, upperside of plate densely beset with short setae at and near the edges (Pl. XXIII. f. 22). Clasper broadly sole-shaped, apex rounded ; harpe represented by a small subbasal, broadly triangular ridge, which bears an obliquely vertical carina (Pl. XXXI. f. 9). Penis-sheath without special armature, apical edge produced on one side, the lobe bent inwards, fused with the membrane of the duct.

♀. Eighth tergite scaled, mesially grooved, lobes rounded (Pl. XV. f. 13). Vaginal plate also feebly chitinised, distal margin evenly rounded, no special armature (Pl. XV. f. 12).

Early stages not described.

Hab. Akbès, Syria.

Apparently not rare.

A very long series in coll. Charles Oberthür.

In the Tring Museum 66 specimens.

LI. OXYAMBULYX gen. nov.—Typus : *substrigilis*.

Sphinx (*Ambulyx*), Westwood, *Cab. Or. Ent.* p. 61 (1848) (*nom. indescr.*).

Ambulyx Walker, *List Lep. Ins. B. M.* viii. p. 120 (1856) (partim ; *type* : *strigilis*).

♂ ♀. Differs from *Protambulyx* in the following characters : end-segment of antenna compressed, bottle-shaped or conical in side-view (Pl. LX. f. 5), variable in length, but at least four times as long as the preceding one, which is longer than high, two bristles at end and several others on the lateral and ventral surface, dorsal surface of segment covered with appressed scaling. Head with a sharp

interantennal crest. Spurs unequal, short ones more than half the length of the long ones, longer apical one of hindtibia more than half the length of the first tarsal segment. Apex of forewing acuminate, not excised; R^2 of hindwing in or below centre of cell, D^3 as long as, or longer than D^1. Scales at lateral edge of eighth tergite of ♂ prolonged to a triangular crest.

Larva: head triangular; white oblique side-bands; horn long.—Insufficiently known.

Chrysalis not sufficiently known: the figures too vague.

Hab. Indo-Australian Region, as far north as Japan, eastwards to the Solomon Islands.

Sixteen species.

The head has a sharply defined transverse band between the antennae. The band on the thorax does not occupy the whole of the distal two-thirds of the mesothoracic tegula, the tip and sides remaining of the colour of the disc of the thorax. The mid- and hindtibia bear a white basal spot as in *Amplypterus*. The submarginal line of the forewing begins at the very tip of the wing; the line in the apex of the cell is more or less oblique, often horizontal. The hindwing has a band beyond cell and one or two dentate lines in outer half; the distal line is often absent or vestigial. The patch of modified scales on the clasper is more or less ovate.

The species fall into three groups: *substrigilis*-group (12 species), *canescens*-group (one species), *semiferrens*-group (three species). The harpe is of a different type in the three groups. The species of the first group bear all a rather close resemblance to each other, and are easily confounded. They required a closer examination and more careful study than had hitherto been bestowed upon them. The differences in pattern, as pointed out in the key here appended, are corroborated by differences in structure in both sexes, so far as both sexes are known to us. No notice has been taken of the great dissimilarity between the larvae of *liturata* and *substrigilis* by those authors who put the whole lot of species allied to *substrigilis* together under one name. The statement made here and there that *substrigilis* is very variable individually is based upon the assumption that the different individuals called *substrigilis* belonged all to the same species, which assumption is quite incorrect. In *Fauna Brit. Ind., Moths* there are six species mixed together under *substrigilis*. They are not mere geographical forms, but species of the same country, constantly differing in colour and structure. It was not carelessness which misled Hampson to treat so many distinct species as synonymous, and misled also one of the authors of the present paper to suggest that *auripennis*, *sericeipennis*, etc., were subspecies or perhaps only aberrations of one species, but the reason underlying those opinions was of quite a different kind. Butler, and also Moore, had described as distinct in several instances either the sexes or geographical races (subspecies). When this was noticed, reaction carried me (Rothschild) too far, and I united also forms which are really distinct, because I found that the characters by which the respective authors separated the species did not hold good. Though I was right in this latter respect, I was wrong in assuming, with Hampson and others, that there were no constant differences, the actual distinguishing characters of the various species not having been known until we studied the insects for the purpose of the present Revision.

Most of the species are confined to the Himalayas; their range will doubtless be found to be less restricted than it appears to be at present, when the Sphingid

Fauna of Burma, China, and adjacent countries is better explored. *O. substrigilis* occurs from Ceylon and North India to Java and the Philippines, and is replaced farther east by *wildei* in New Guinea and Queensland, and a very peculiar modification, named *meeki*, on the Solomon Islands; no representative of the *substrigilis*-group has as yet been found on the Moluccas, and *substrigilis* itself is the only one found of this group in the Malayan Subregion. *O. ochracea* occurs from North India to Japan. *O. subocellata* ranges from Ceylon and North India to Java, Borneo and China, and is replaced farther east by *semifervens* on the Moluccas, and by *dohertyi* in New Guinea and the Solomons.

Key to the species:

A. Greenish olive band on thorax about 1 mm. broad in middle, or indistinct, or absent; subbasal spots of forewing encircled with white.
  a. Forewing above with three or two subbasal spots behind cell . . . . . *b*.
  Forewing above with one spot behind cell; the spot often incised . . . . 171. *O. dohertyi*.
  b. No olive band on mesothorax . . 170. *O. semifervens*.
  With olive band on mesothorax . . 169. *O. subocellata*.
B. Band of thorax broader; three contiguous postcellular subbasal spots on forewing besides a spot *in* the cell; upperside whitish grey . . . . . .168. *O. caneseens* (Pl. IX. f. 5, ♂).
C. Band of thorax more than 1 mm. wide in middle; one subbasal postcellular spot on the forewing, or a broad subbasal band.
  c. A broad olive subbasal band on forewing 167. *O. japonica*.
  A single rounded postcellular spot. . . . . *d*.
  d. Forewing with rounded subbasal costal spot beyond the subbasal bar; eighth tergite of ♂ with or without a mesial patch . . . . . *e*.
  Forewing without a spot beyond the bar, or there is only a longitudinal dash; eighth tergite of ♂ without a patch; or hindwing with blackish basal patch . . *i*.
  Forewing with a small costal spot beyond the bar, situated in a grey oval spot; grey median interspace sharply defined, less than 3 mm. wide behind . . 166. *O. meeki* (Pl. I. f. 2, ♂).
  e. Basal area of hindwing brown; antemedian and first discal lines of forewing joining each other at SM^2, the median area therefore not extended to hinder margin, both the costal and postcellular basal spots very large. . . . 158. *O. bima* (Pl. IX. f. 1, ♀).

Not so; abdomen without a trace of the middle line (eighth tergite of ♂ excepted); ground-colour yellow . 162. *O. ochracea* (Pl. VIII. f. 14, ♂).

Not so; abdomen with a mesial line . . . . *f.*

f. Apical line of cell of forewing in the direction of R^3, black submarginal line continued to hindmargin, here about 1½ to 2 mm. from edge of wing; no patch on eighth tergite of ♂ . 157. *O. placida* (Pl. IX. f. 3, ♂)

Apical line of cell about at right angles to costa, forming an obvious angle with the line R^3; a patch upon eighth tergite of ♂; black submarginal line ending at or before angle of wing . . . . *g.*

g. Brown submarginal line of underside of forewing not marked . . . . 160. *O. lahora.*

Brown submarginal line of underside of forewing marked . . . . . *h.*

h. Grey marginal area of underside of forewing narrowed to a point at M^2, not continued beyond this vein . . 159. *O. maculifera* (Pl. IX. f. 4, ♂).

Grey submarginal area continued beyond M^2, broader at R^2 than cellule R^2—R^3 is wide at margin . . . . 161. *O. schauffelbergeri.*

Grey submarginal area continued beyond M^2, narrower at R^2 than cellule $R^2 - R^3$ is wide at margin . . 156. *O. sericeipennis* (Pl. IX. f. 2, ♂).

i. Hindwing above with a blackish tawny or black basal patch . . . . . *j.*

Hindwing above without a blackish tawny or black basal patch . . 163. *O. liturata* (Pl. VIII. f. 10, ♂).

j. Underside of body walnut brown (♀); or (♂) grey marginal band of underside of forewing only 1½ mm. broad at R^2 . 165. *O. wildei* (Pl. VIII. f. 3, ♂; 4, ♀.

Underside of body varying from ochreous to reddish cinnamon-rufous; grey area twice as wide as before, or basal patch of hindwing quite black . 164. *O. substrigilis* (Pl. VIII. f. 1, ♀; 2, ♂).

156. **Oxyambulyx sericeipennis** (Pl. IX. f. 2, ♂).

* *Ambulyx sericeipennis* Butler, *Proc. Zool. Soc. Lond.* p. 252. n. 34 (1875) (Massuri:—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 580. n. 8 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 23. n. 122 (1887); Kirby, *Cat. Lep. Het.* i. p. 675. n. 11 (1892).

Ambulyx substrigilis, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 77. n. 103 (1892) (partim); Dudg., *Journ. Bombay N. H. Soc* xi. p. 408. n. 103 (1898) (partim).

♂ ♀. Similar to *A. maculifera*, much more grey, the outer margin of the forewing proportionally longer, the submarginal line of the same wing extended

to internal margin both above and below. Abdomen of ♂ with patch on eighth tergite, a distinct mesial line in both sexes. Underside deep chrome.

♂. The eighth sternite of the abdomen (Pl. XXII. f. 27) slightly bisinuate, the mesial portion almost straight, not distinctly lobed, its edge incrassate internally, having, in a view from the apical side, the appearance of being turned dorsad. Harpe (Pl. XXXI. f. 16) with a long finger-like distal process (*pr*), which points ventrad; the mesial ridge (*rm*) consisting of two lamellae, irregularly dentate and distally produced into a cone, the extreme end of which is turned ventrad. The penis-sheath (Pl. XXX. f. 9) nearly shaped as in *maculifera*, but there is a row of teeth dorsally, and also some irregular teeth ventrally; from the sheath protrudes a blunt, somewhat club-shaped "love-dagger." The tenth sternite (Pl. XXIII. f. 9) is lobed mesially, the lobe is rather narrow, almost truncate. Process of penis-sheath of type-specimen suddenly curved; normal in a second specimen from N.W. India.

♀. Vaginal plate similar to that of *maculifera*, but the mesial lobe longer and broader.

Early stages not known.

Hab. North-West India to Tenasserim.

In the Tring Museum 7 ♂♂, 3 ♀♀ from: Randakeit, N.W. India (Mansfield): Sikhim; Khasia Hills; Jaintia Hills; Tandong, Tenasserim, 4000 ft., May (Fruhstorfer).

The Tenasserim individual is not well preserved; it is much more pale yellow than ordinary *sericeipennis*, and has scarcely a trace of lines on the forewing.

157. **Oxyambulyx placida** (Pl. IX. f. 3, ♂).

**Ambulyx placida* Moore, *Proc. Zool. Soc. Lond.* p. 390 (1888) (Solon;—Mus. Brit.); Butl., *Illustr. Typ. Specim. Lep. Het. B. M.* vii. p. 25. t. 121. f. 1 (1889); Kirby, *Cat. Lep. Het.* i. 675. n. 13 (1892).

Ambulyx substrigilis, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 77. n. 103 (1892) (partim): Dudg., *Journ. Bombay N. H. Soc.* xi. p. 408. n. 103 (1898) (partim; Sikhim).

♂♀. A very pale species. Forewing similar to that of *sericeipennis*, but first discal line, which is the only distinct line, more distal, at R^3 about midway between cell and the broad yellowish proximal border of the submarginal line: line across apex of cell in the same or nearly the same direction as the streak upon R^3. A subbasal costal patch on forewing. Abdomen in ♂ with fine mesial line, no patch on eighth tergite; in ♀ without line. Underside of wings deep chrome (Ridgway, *Nomencl. Colours* vi. 6).

There are apparently two subspecies:

a. The pair from N.W. India in the British Museum is very pale grey on the forewing; the line across apex of cell forms an obtuse angle with the line upon R^3; the round subbasal spot behind cell is small; the eighth sternite of the ♂ has a truncate-sinuate mesial lobe of which the angles are not distinctly toothed.

b. The individuals from Sikhim have the subbasal round patch of the forewing, behind cell, enlarged, the line across apex of cell more horizontal, and the angles of the lobe of the eighth sternite produced.

♂. Tenth sternite deeply sinuate, the two lobes rounded (Pl. XXIII. f. 8). Eighth sternite mesially with a lobe which is or is not toothed at the angles. Harpe broad (Pl. XXXI. f. 18); distal process (*pr*) rather short, somewhat concave above, curved downward, obtusely pointed; submesial process (*pm*) hollow,

formed by two lamellae being curved towards each other and together produced distad, this process resembling that of *japonica*. Penis-sheath (Pl. XXX. f. 12) wider than in the allied species, ventrally chitinised to end, armed with a short stout ventral hook and an obliquely truncate dorsal process which is irregularly notched.

♀. Vaginal area similar to that of *liturata*.

Early stages not known.

Hab. N.W. India and North India.

In the Tring Museum 4 ♂♂ from: Sikhim, May (Pilcher), March—April (Fruhstorfer).

158. **Oxyambulyx bima** spec. nov (Pl. IX. f. 1, ♂).

♂. Unknown.

♀. Body as in ♀ of *O. maculifera*, less grey above, dorsal line of abdomen very distinct; foretibia spinose at end.

Wings, upperside.——Forewing: resembling in the grey tone *O. sericeipennis*, but more fawn-colour, outer area not so dark, wing broader, the hinder angle less produced; both subbasal patches very large, the costal one nearly 7 mm. long, the proximal submedian line not marked, the distal one more distal than in the allied species, the upper portion of the line rather heavy, at right angles to the costal margin, running from the margin to the lower cell-angle, then continued as a very thin line in a curve to vein M^2, which it reaches 3 mm. from the discal line; the latter begins as a cloud at the costal margin, is very thin between R^1 and internal margin, consisting of faint lunules, the line crosses M^2 13 mm. from the edge of the wing, standing here a little nearer the cell than outer margin; the following lines indistinct, except oblique costal portions; submarginal line as in *sericeipennis*. ——Hindwing: basal area up to median band heavily washed with mummy brown.

Underside less mottled with blackish brown than in *sericeipennis*, the submarginal blackish brown line of the forewing well marked, the grey scaling outside it not reaching vein M^2.

♀. Vaginal plate rather strongly chitinised (Pl. XV. f. 5); orifice not large, its anterior edge not much raised, simple; postvaginal part of plate large, rounded. The two halves of the eighth tergite strongly rounded, the sinus rather wide and deep.

Length of forewing: ♀, 60 mm.; breadth 25 mm.

The last antennal joint of the single known individual of this insect is much longer than in any other specimen of *Oxyambulyx* we have seen.

Hab. Bima, Sambawa, Feb. 1896 (W. Doherty).

One ♀ in the Tring Museum.

159. **Oxyambulyx maculifera** (Pl. IX. f. 4, ♂).

*.1 *mbulyx maculifera* Walker, *List. Lep. Ins. B. M.* xxxv. p. 185 (1866) (Darjiling, ♀;—Mus. Brit.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 580. n. 4 (1877) (Darjiling); id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 10. t. 10. f. 3 (1881); Cot. & Swinh., *Cat. Moths Ind.* i. p. 22. n. 119 (1887); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 25. n. 99 (1892), Kirby, *Cat. Lep. Het.* i. p. 676. n. 19 (1892).

*.mbulyx *consanguis* Butler, *Illustr. Lep. Het. B. M.* v. p. 11. t. 80. f. 2 (1881) (Darjiling, ♂;—Mus. Brit); Cot. & Swinh., *l.c.* n. 120 (1887); Kirby, *l.c.* p. 675. n. 17 (1892)

Ambulyx substrigilis, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 77. n. 103. fig. 49 (♀) (1892) (partim); Roth-ch., Nov. Zool. i. p. 87 (1894); Dudg., *Journ. Bombay N.H. Soc.* xi. p. 408. n. 102 (1898) (partim; Sikhim).

Ambulyx schauffelbergeri, Leech (*non* Brem. & Grey, 1852), *Trans. Ent. Soc. Lond.* p. 280. n. 43 (1898) (partim).

♂ ♀. Recognisable by the presence of a large subbasal patch at the costal margin of the forewing, the mesial line on the abdomen developing in the ♂ into a patch upon the eighth segment, the strong curvature of the submarginal line of the forewing, this line reaching the edge of the wing at M^2, and by the posterior bars composing the discal line of the forewing being obviously arched. The forewing is ochraceous clay colour *above* in the ♂; nearly burnt umber brown, shaded with grey, in the ♀. A few spines on the foretibia externally near the apex. Underside of wings much shaded with tawny in the basal area, especially in the ♀, abdomen and wings, *below*, much less yellow than in *sericeipennis* and *placida*.

♂. The eighth abdominal sternite (Pl. XXII. f. 28) is mesially very slightly sinuate, the sinus limited on each side by a small tooth. The penis-sheath (Pl. XXX. f. 10) is dorsally gradually narrowed to a point; it is devoid of any additional armature. The harpe (Pl. XXXI. f. 19) has a very heavy, strongly curved, submesial hook (*pm*), which is the distal prolonged part of a double submesial ridge; the ventral process (*pc*) is curved downwards, rather blunt, finger-like. The tenth sternite is mesially lobed as in *sericeipennis* (Pl. XXIII. f. 7).

♀. Eighth tergite deeply incised. Vaginal plate similar to that of *sericeipennis* and *schauffelbergeri*, the mesial lobe narrower (Pl. XV. f. 3).

Early stages not known.

Hab. North India: Sikhim; probably more widely distributed.

In the Tring Museum 13 ♂♂, 6 ♀♀ from Sikhim, some July (Pilcher).

160. **Oxyambulyx lahora.**

**Ambulyx lahora* Butler, *Proc. Zool. Soc. Lond.* p. 251. n. 35 (1875) (N.W. Himal.;—Mus. Brit.); id., *Trans. Zool Soc. Lond.* ix. p. 580. n. 9. t. 93. f. 9 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 23. n. 123 (1887); Kirby, *Cat. Lep. Het.* i. p. 676. n. 21 (1892).

Ambulyx semifervens, Hampson (*non* Walker, 1856), in Blanf., *Fauna Brit. Ind.* i. p. 78. n. 104 (1892) (partim).

♂. Resembling *maculifera*, more reddish in tint. Abdomen with middle line, which is dilated to a patch on the eighth tergite. Forewing above with large subbasal costal patch, submarginal line vestigial, with grey border; hindwing more distinctly dentate, margin chestnut, not black, few speckles. Underside of body and wings rufous tawny like the upperside of the hindwing, lines on disc of fore- and hindwing slightly deeper in tint, no distinct speckles, no submarginal line on forewing, grey marginal area broad. Eighth abdominal sternite rounded. Tenth tergite (Pl. XXII. f. 30) with dorsal apical surface more slanting than in *maculifera*. Harpe (Pl. XXXI. f. 20) similar to that of *sericeipennis* in the submesial ridge consisting of two dentate lamellae which are together produced into a cone of which the tip curves ventrad; distal process spoon-shaped as in *maculifera*, *liturata* and *substrigilis substrigilis*, the process less broad than in these insects. Penis-sheath (Pl. XXX. f. 14) curving dorsad, with a dorsal row of teeth, apex truncate; a stronger chitinised ventral fold bearing three heavy teeth.

♀ and early stages not known.

Hab. N.W. India; 1 ♂ in the British Museum (*type*).

161. Oxyambulyx schauffelbergeri.

Ambulix schauffelbergeri Bremer & Grey, in Motsch., *Et. Ent.* i. p. 62. n. 17 (1852) (Pekin); id., *Schm. N. China's* p. 12. n. 33 (1853); Ménétr., *Enum. Corp. Anim. Petr., Lep.* p. 93. n. 1553 (1857).

Ambulyx (?) *schauffelbergeri*, Walker, *List Lep. Ins. B. M.* viii. p. 123. n. 5 (1856) (var. of *substrigilis*?); Butl., *Trans. Zool. Soc. Lond.* ix. p. 582. n. 20 (1877).

Ambulyx substrigilis var.? *schauffelbergeri*, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 188. n. 11 (1875) (partim).

Ambulyx schauffelbergeri, Leech, *Proc. Zool. Soc. Lond.* p. 585. n. 20 (1888) (partim); Kirby, *Cat. Lep. Het.* i. p. 675. n. 16 (1892); Leech, *Trans. Ent. Soc. Lond.* p. 280. n. 43 (1898) (partim).

**Ambulyx trilineata* Rothschild, Nov. Zool. i. p. 88 (1894) (Kiushiu;—Mus. Tring).

♂ ♀. Resembling in colour *sericeipennis*; much smaller; the submarginal line of the forewing nearly as in *maculifera*; both sexes without dorsal line on the abdomen, but the ♂ has a dorsal patch on segment 8. The subbasal costal patch of forewing is wider than the posterior patch. The discal line of the forewing stands nearer the cell than in *ochracea*, and the cellular portion of the distal submedian line extends to the lower angle of the cell.

♂. The eighth abdominal sternite is mesially rounded (Pl. XXII. 29). The harpe (Pl. XXXI. f. 15) resembles that of *sericeipennis*, but the distal process (*pr*) is shorter, not curved ventrad, the cone *pm* of the submesial dental ridge is not quite so high, acutely pointed, the tip turned ventrad. The penis-sheath (Pl. XXX. f. 8) differs markedly from that of *sericeipennis*; the dorsal process is short and differently shaped, and is armed with a dense row of teeth extended to the end of the process; the ventral teeth, situated at the edge of a fold of the membranaceous part of the penis, are larger; there are two very heavy ones, preceded distally by a number of small ones; the ridge, or fold, is turned dorsad in the specimen from which the figure was taken; this position is owing to the duct protruding partly from the sheath. The tenth sternite agrees with that of *sericeipennis*.

♀. Vaginal plate with the ridge in front of the cavity mesially produced into a long broad lobe, which is asymmetrically sinuate in the specimen dissected: cavity large, its hinder wall mesially raised to a transversely carinate tubercle; distal edge of plate broadly rounded; the plate agrees best with that of *maculifera*, but the mesial lobe is much broader.

Early stages not known.

Hab. Japan; North China.

In the Tring Museum 4 ♂♂, 2 ♀♀ from: Shanghai; Hondo, Japan; Kiushiu.

In 1894 I identified *ochracea* erroneously as *schauffelbergeri*, following Leech, and described this as new (W. R.).

162. Oxyambulyx ochracea (Pl. VIII. f. 14, ♂).

**Ambulyx ochracea* Butler, *Cist. Ent.* iii. p. 113 (1885) (Japan;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 675. n. 5 (1892).

Ambulyx schauffelbergeri, Leech (*non* Bremer & Grey, 1852), *Proc. Zool. Soc. Lond.* p. 585. n. 20 (1888) (partim; Japan); Rothsch., Nov. Zool. i. p. 86 (1894); Leech, *Trans. Ent. Soc Lond.* p. 280. n. 43 (1898) (partim; Japan).

Ambulyx substrigilis, Hampson (*non* Westwood, 1848), in Blanf., *Fauna Brit. Ind., Moths* i. p. 77. n. 103 (1892) (partim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 408. n. 102 (1898) (partim; Sikhim).

♂ ♀. Both sexes are without a dorsal line on the abdomen, but the ♂ has a patch on the eighth tergite. The posterior subbasal patch of the forewing is very

large, larger than the costal patch. The ♂ is the most uniformly yellow species of the Indo-Malayan *Oxyambulyx*; the ♀ is darker than the ♂. In both sexes the distal submedian line crosses M at the base of M^1, the portion of the line within the cell being less oblique than in *maculifera*, *schauffelbergeri* and others, not extending distad to the lower angle of the cell.

♂. The eighth sternite of the abdomen is not essentially different from that of *A. schauffelbergeri* (Pl. XXII. f. 29). The harpe (Pl. XXXI. f. 14) has a blunt, concave distal process (*pv*), the mesial ridge (*cm*) is short, and is produced into a heavy tooth; the ridge connecting this tooth with the distal process (*pv*) is irregularly dentate. The penis-sheath (Pl. XXX. f. 7) bears no armature besides the dorsal process, which, being obliquely truncate in a ventro-dorsal direction, is sharply pointed. The tenth sternite (Pl. XXIII. f. 10) is very much broader mesially than in *sericeipennis* and *schauffelbergeri*, and has, as in these species, no mesial sinus.

♀. Vaginal plate (Pl. XV. f. 4) with a high ridge before the cavity, the ridge deeply sinuate, the sinus widened proximally, the lobes of the ridge thus formed strongly rounded, projecting mesiad: postvaginal part of plate with the sides oblique, shallowly sinuate, apex rounded.

Early stages not known.

Hab. Japan to North India.

In the Tring Museum 14 ♂♂, 3 ♀♀ from: Japan: Sikhim.

163. **Oxyambulyx liturata** (Pl. VIII. f. 10, ♂).

**Ambulyx liturata* Butler, *Proc. Zool. Soc. Lond.* p. 250. n. 32 (1875) (hab.? descr. of larva;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 580. n. 5. t. 91. f. 2 (*l*). 3 (*p*) (1877); Kirby, *l.c.* p. 676. n. 20 (1892); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 25 n. 98 (1892) (haec spec.?!).

**Ambulyx rhodoptera* Butler, *Proc. Zool. Soc. Lond.* p. 251. n. 33 (1875) (Darjiling;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 580. n. 6. t. 93. f. 8 (♀) (1877) (Darjiling); Cot. & Swinh., *Cat. Moths Ind.* i. p. 23. n. 121 (1887); Kirby, *l.c.* p. 675. n. 12 (1892).

♂♀. Easily distinguished from *maculifera* by the absence of the round subbasal costal patch, which is occasionally indicated in the present species by a longitudinal dash. Abdomen with mesial line which is *not* dilated to a patch on the eighth tergite of the ♂. From the continental forms of *substrigilis*, with which *liturata* is easily confounded, it can be distinguished, apart from the different sexual armature, by the base of the hindwing being less tawny and never black, and by the submarginal line of the forewing being more proximal posteriorly.

Some of the ♀♀ are as pale as the ♂♂, while others are deeper in tint, and have a more distinct violet-grey gloss on the forewing.

♂. Eighth abdominal sternite bisinuate, being rounded-convex mesially (Pl. XXII. f. 25), the edge of this lobe thickened internally, which gives the edge the appearance of being bent internad. Tenth sternite similar to that of *placida*, being more deeply sinuate than in *substrigilis*. Harpe (Pl. XXXII. f. 1) with an almost vertical submesial process (*pm*) at the distal end of the submesial ridge: distal process *pv* very broad, spoon-shaped. Penis-sheath (Pl. XXX. f. 11, ventral view) with two dentate folds, which are unequal in length; the strongly chitinised dorsal part of the sheath prolonged into a short obtuse process.

♀. Vaginal plate (Pl. XV. f. 7) with a very large vaginal cavity; proximal part of plate membranaceous, edge of cavity raised to a folded ridge which is mesially sinuate, here less chitinised than laterally; distal part of plate rounded, trans-

versely multicarinate. Eighth tergite mesially membranaceous, the strongly chitinous plate deeply incised.

Larva (fig. by Butler, *l.c.*) : green, first three segments with white dorso-lateral line, following segments with yellowish side-bands ending in white patches which are bordered red in front ; horn almost straight.

Chrysalis apparently without frontal tubercles.

Hab. North India : Sikhim : Assam.

In the Tring Museum 14 ♂♂, 10 ♀♀ from : Sikhim, some in June and July ; Silhet (Möwis ; loc. correct ?).

164. **Oxyambulyx substrigilis** (Pl. VIII. f. 1. 2, ♂).

**Sphinx* (*Ambulyx*) *substrigilis* Westwood, *Cab. Or. Ent.* p. 61. t. 30. f. 2 (♂) (1848) (Silhet ; — Mus. Brit.)

♂♀. The species is easily distinguished from the other *Oxyambulyx* by the large black or tawny basal patch of the hindwing. It agrees in pattern best with *O. liturata*, both species being devoid of the round subbasal costal spot on the forewing so conspicuous in *maculifera*, *ochracea*, *sericeipennis*, etc. The dorsal line of the abdomen is distinct ; it is not dilated to a patch on the eighth tergite. The apical line of the cell of the forewing is mostly so oblique as to form a direct prolongation of the line R^3. The foretibia has spines at the end.

♂. Tenth sternite (Pl. XXIII. f. 11) mesially sinuate, the sinus smaller than in *liturata*, *placida*, etc. Eighth sternite mesially produced into a truncate lobe (Pl. XXII. f. 27), of which the angles are somewhat pointed, each bearing, moreover, internally a pointed tubercle or tooth, which is just visible in a ventral view of the segment. Harpe varying strongly geographically, and slightly also individually ; it consists of a ventral and a submesial ridge ; the ventral ridge is either denticulated or entire ; the upper ridge is produced into a long, tapering, pointed, curved, somewhat twisted process *pm*, which stands nearly vertically upon the plane of the clasper ; the form of this process is not constant either individually or geographically ; both the ventral and submesial ridges unite distally to form a distal ventral process, which is either pointed, gradually tapering to the end (Pl. XXXII. f. 4. 5), or is broadly spoon-shaped (Pl. XXXII. f. 2. 3). The penis-sheath (Pl. XXX. f. 3. 4. 5) is ventrally membranaceous for several millimetres; along this membranaceous part runs at each side a dentate fold ; the dorsal side of the sheath is heavily chitinised, and is produced into a subcylindrical and more or less pointed and bent process of geographically variable length, the process being longest in Bornean individuals (we have not seen a ♂ from the Philippines) and shortest in North Indian specimens : from the mouth of the sheath protrudes a spine-like process situated upon the membrane of the duct (pushed out with the duct in Pl. XXX. f. 4).

♀. Vaginal plate (Pl. XV. f. 6) characterised by a heavy, irregularly notched ridge in front of the orifice.

Larva (of *O. substr. auripennis*, figured by Moore, see below) green, a white subdorsal line from pronotum to horn, six yellowish oblique side-bands, a whitish ventro-lateral line, interrupted ; horn stout. —Food-plant : *Dipterocarpus*.

Chrysalis also figured by Moore, cremaster prominent ; apparently no tubercles on head.

Hab. North India to the Andamans, Philippines and Java.

Five subspecies.

The differences in the genital armature between the Indian and Malayan *males* are so very marked, that one cannot fail noticing them when dissecting a specimen. Judging from these organs alone one might be induced to treat the specimens as belonging to at least two species. On examining, however, a series from Borneo and Java we find that the differences are less obvious in some specimens than in others, and we believe that the material from Malacca, Tenasserim and Burma will show intergradations between the armature of the Indian and Ceylonese and the Malayan *males*. For the present, the Indian and Ceylonese races stand quite apart from the others. Their characters are partly very strange; for both subspecies share the broadly spoon-shaped ventro-distal process of the harpe and the more proximal position of the (middle part of the) submarginal line of the forewing with another species of North India (*liturata*), a similarity in these compatriots which is surely not mimetic resemblance.

a. O. substrigilis auripennis.

**Ambulyx auripennis* Moore, *Proc. Zool. Soc. Lond.* p. 388 (1879) (Ceylon ; —Mus. Dublin) ; id., *Lep Ceylon* ii. p. 11. t. 79. f. 1 (♂). 1a (*l*). 1b (*p*) (1882) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 24. n. 128 (1887) (Ceylon) ; Kirby, *Cat. Lep. Het.* i. p. 675. n. 10 (1892) (Ceylon).

Ambulyx substrigilis, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 77. n. 103 (1892) (partim) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* ix. p. 2. n. 29 (1893) (Kandy).

♂. Body below deeper yellow than in North Indian *substrigilis*. Markings of wings less heavy ; submarginal black line of forewing vestigial above, absent below ; long scales of fringe of hindwing white.——Process *pm* of harpe shorter and slenderer than in *substr. substrigilis* (Pl. XXXII. f. 2) ; process of penis-sheath stouter.

♀. Not known.

Early stages see above.

Hab. Ceylon.

Type in the Dublin Museum. A second ♂ in the British Museum.

b. O. substrigilis substrigilis (Pl. VIII. f. 2, ♂)

**Sphinx* (*Ambulyx*) *substrigilis* Westwood, *l.c.* (1848) (Silhet ;—Mus. Brit.).

Ambulyx substrigilis, Walker, *List Lep. Ins. B. M.* viii. p. 122. n. 3 (1856) (Silhet) ; Moore, *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal); id., *l.c.* p. 676 (1867) (partim ; = *maculifera* ex errore !!); Boisd., *Spec. Gén. Lép. Hét.* i. p. 188. n. 11 (1875) (partim) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 579. n. 3 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 675. n. 15 (1892) ; Hamps. in Blanf., *Fauna Brit. Ind., Moths* i. p. 77. n. 103 (1892) (partim) ; Rothsch., Nov. Zool. i. p. 87 (1894) (partim) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 408. n. 102 (1898) (partim).

Ambulyx philemon Boisduval, *Consid. Lép. Guatemala* p. 68 (1870).

(?) *Ambulyx substrigilis*, Moore, *Proc. Zool. Soc. Lond.* p. 344 (1878) (Taoo, 3500 ft.) ; Swinh., *Trans. Ent. Soc. Lond.* p. 164. n. 18 (1890) (Taoo).

♂ ♀. A small form ; resembling *O. liturata* very much, as the basal patch of the hindwing is often pale tawny and not conspicuous. ♂ more grey on the forewing than in *liturata* and the Malayan forms of *substrigilis*, agreeing in this respect better with *sericeipennis*. The basal patch of the hindwing less sharply defined in either sex, and generally less black than in the Malayan races, the submarginal line more arched, farther away from the margins at R^2 both above and below, the line sharply marked and deep in tint below.

♂. The distal process of the harpe very broad, spoon-shaped, shorter than in *liturata*, markedly different from the pointed process of the Malayan forms

(Pl. XXXII. f. 3); the submesial process more erect, and the ventral ridge scarcely elevate, not denticulate. The apical process of the penis-sheath (Pl. XXX. f. 5) short, blunt at the end, curved ventrad, *i.e.* in the opposite direction than in *eteocles* and *pryeri*.

Early stages not known.

Hab. North India: Sikhim; Assam; Andamans.

In the Tring Museum 5 ♂♂, 4 ♀♀ from: Sikhim; Assam; Andamans.

c. O. substrigilis pryeri (Pl. VIII. f. 1, ♀).

Ambulyx pryeri Distant, *Ann. Mag. N. H.* (5). xx. p. 271 (1887) (N. Borneo); Kirby, *Cat. Lep. Het.* i. p. 676. n. 22 (1892).

♂♀. Submarginal line of forewing less curved than in the Indian form; black basal patch of hindwing very conspicuous.

♂. Ventro-distal process of harpe (Pl. XXXII. f. 4) gradually narrowed to the end: ventral ridge high, denticulated; submesial process leaning distad and ventrad. Process of penis-sheath very long (Pl. XXX. f. 3), varying somewhat individually in length, but always longer than the sheath is broad.

Early stages not known.

Hab. Malacca; Sumatra; Borneo.

In the Tring Museum 8 ♂♂, 3 ♀♀ from: Kina Balu, N. Borneo; Sarawak; Limbang R., Sarawak, June 1895 (A. Everett); Mt. Dulit, Sarawak (Hose); Benkoelen, Sumatra (Ericsson); Perak (C. Curtis).

d. O. substrigilis eteocles.

**Ambulyx substrigilis* var.? *moorei* Boisduval (*non* Moore, 1857), *Spec. Gén. Lép. Hét.* i. p. 189. sub n. 11 (1875) (Java;—coll. Charles Oberthür).
Ambulyx moorei, Kirby, *l.c.* n. 24 (1892) (partim).
Ambulyx moorei?, Huwe, *Berl. Ent. Zeitschr.* xl. p. 367. n. 38 (1895) (Sukabumi, Java, 2000 ft.).
Ambulyx eteocles id., *l.c.*

♂♀. There is very little difference in colour and pattern between this form and *pryeri*. The ♂ is recognisable by the sexual armature, and the ♀ by the deeper chocolate-brown colour of the forewing.

♂. Distal process of harpe (Pl. XXXII. f. 5) nearly as in *pryeri*, curved a little more ventrad; submesial process more erect and the ventral ridge less high than in *pryeri*. Process of penis-sheath (Pl. XXX. f. 4) shorter than in *pryeri*, curved dorsad, *i.e.* in the opposite direction to that in *substrigilis*.

Early stages not known.

Hab. Java.

In the Tring Museum 2 ♂♂, 2 ♀♀ from Mount Gedé, 4000 ft., and Sukabumi, 2000 ft., received from Herr Fruhstorfer; "Java" (ex coll. Felder).

e. O. substrigilis staudingeri.

**Ambulyx staudingeri* Rothschild, *Iris* vii. p. 300 t. 7. f. 1 (♀) (1895) (Mindanao;—coll. Staudinger); Semp., *Schmett. Philipp.* ii. p. 392. n. 25 (1896) (Luzon, 1 ♀, April).

♀. Submarginal line of forewing close to edge of wing from M^1 to angle, anal area blackish; bands of hindwing enlarged.

Hab. Philippine Islands: Luzon, Mindanao.

In coll. Staudinger and coll. Semper.

165. **Oxyambulyx wildei** (Pl. VIII. f. 3, ♂; f. 4, ♀).

Ambulyx wildei Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 20. n. 35 (1891) (Cairns).

Miskin's description, though long, is not precise enough to recognise his insect with certainty. No Queensland specimens have come to our notice; but we have of the type a photograph kindly sent to us by Mr. De Vis, the curator of the Brisbane Museum. Similar to small specimens of *substrigilis*. Foretibia with a few spines.

♂. As pale as Indian *substrigilis*, the submarginal line of the forewing nearer the margin above and below, distinct; the marginal area between this line and the fringe brown on the upperside, grey below, only 1½ mm. wide at R^2 and not extending below M^1.——Eighth sternite mesially lobed as in *substrigilis*, the angles of the lobe *not* acuminate, *not* tuberculiform internally. Tenth sternite sinuate mesially, the sinus deeper than in *substrigilis* and the sides of the plate more slanting. Harpe (Pl. XXXI. f. 21) resembling that of *sericeipennis* in the development of the mesial ridge, which consists of two lamellae which join each other distally, where they are raised into a short obtuse process which points obliquely basad; a distinctly raised ventral ridge as in *substrigilis*, low, extending to the end of the harpe, forming a kind of crest upon the otherwise flat, spoon-shaped, distal process. Penis-sheath (Pl. XXX. f. 6) resembling that of *substr. substrigilis*; a dentate fold at each side, the left saw-blade extending beyond the opening of the sheath reaching the end of the somewhat club-shaped apical process.

♀. Much deeper brown than the ♂, even deeper in tint than the deepest-coloured *substrigilis*; tip of *abdomen* (long scales of eighth tergites) seal-brown, as dark as the band of the thorax; palpus, tibiae and tarsi also deep brown. Lines across forewing conspicuous, submarginal line heavy on the upperside; basal patch of hindwing brownish black, bands heavy. *Underside* of wings burnt umber-brown, almost walnut-brown, especially distally, heavily marked with blackish brown, the disc paler here and there; the grey marginal area of the forewing rather broader than in ♂, the submarginal line bordering it not distinct; basal half of hindwing shaded over with drab.——Eighth tergite not deeply incised. Vaginal plate broadly rounded distally; the orifice proximal, its proximal edge not prominent.

Length of forewing: ♂, 48 mm.; ♀, 57 mm.

Early stages not known.

Hab. Queensland and New Guinea.

In the Tring Museum 1 ♂ and 1 ♀ from Milne Bay, British N. Guinea (A. S. Meek).

Apparently a Papuan representative of *substrigilis*, with the structure of the sexual organs partly as in *sericeipennis*. A ♂ in the Museum at Budapest from Stephansort, German N. Guinea, has the subbasal spot of the forewing very large, and there is a rather large costal spot distally of the subbasal costal bar.

166. **Oxyambulyx meeki** spec. nov. (Pl. I. f. 2, ♂).

♂ ♀. Allied to *O. wildei*. Foretibia with some spines near end. Abdomen with dorsal line, no patch on eighth tergite of ♂. Wings *above*: Forewing in ♂ grey as in *sericeipennis*, darker in ♀; an oval longitudinal costal subbasal spot, vestigial in ♀; interspace between the two antemedian lines olivaceous, band-like, the band almost evenly curved; grey discal interspace strongly narrowing behind;

interspaces between the discal lines also filled up with olive ; submarginal line not distinct beyond M^1, more strongly curved than in *wildei* ; distal margin less oblique, convex behind middle, hinder margin rather longer than in the allied species, coming near *subocellata* in wing-form.——Hindwing shaded with brown and grey, with few speckles ; apex strongly rounded.

Underside olivaceous tawny, much shaded with brown ; grey marginal area of forewing not extending beyond M^1.

♂. Eighth sternite with a small rounded mesial lobe. Tenth sternite sinuate. Harpe with a pointed curved submesial process and a broad spatulate distal one. Penis-sheath ending in a short process as in *O. substr. substrigilis*, a dentate fold at each side as in that species.

♀. Ridge in front of vaginal cavity shallowly bisinuate, thin but strongly chitinised, nearly smooth ; postvaginal part of plate smooth, truncate, mesially somewhat raised.

Early stages not known.

Hab. Isabel, Solomon Islands, 4. vi. to 9. vii. 1901 (A. S. Meek & Eichhorn), 1 ♂ and 1 ♀ in the Tring Museum.

Easily distinguished from all the other species by the conspicuous olive antemedian and discal bands of the forewing. The species shares the short grey marginal area on the forewing below with *O. dohertyi salomonis*.

167. Oxyambulyx japonica.

**Ambulyx japonica* Rothschild, Nov. Zool. i. p. 87 (1894) (Kiushiu ;—Mus. Tring) ; id., *l.c.* ii. t. 9. f. 6 (1895) : Alph., in Rom., *Mém. Lép.* ix. p. 166 (1897) (Corea, 1 ♀) ; Leech, *Trans. Ent. Soc. Lond.* p. 280. n. 44 (1898) (possibly a form of *schauffelbergeri* ! !).

♂. The broad subbasal band distinguishes this species very markedly. Hind-tibia as long as, and long terminal spur two-thirds the length of, the first tarsal segment ; foretibia without spines.

♀. Darker than ♂, more strongly marked ; not examined by us.

♂. Eighth abdominal sternite provided with two tubercles *internally* near the middle of the apical edge, the tubercles a little higher and farther apart than in *subocellata*. The harpe (Pl. XXXI. f. 17) has two processes ; the ventral one is triangular, pointed (*pr*), the other consists of two lamelliform ridges, the upper edges of which are so bent towards each other that a (hollow) cylinder is formed, which is produced distad, the harpe much resembling that of *placida* (Pl. XXXI. f. 18). The penis-sheath (Pl. XXX. f. 13) is somewhat bent, its apical edge has developed into a short hook (*a*), which is strongly chitinised and is armed with a tooth beneath, and a stout, notched, or dentate process opposite the hook ; there is most likely also an armature inside the sheath, but we have not seen it in the only specimen dissected. The tenth sternite is less deeply sinuate than in *placida*.

Early stages not known.

Hab. Kiushiu : Corea.

In the Tring Museum 2 ♂♂ from Kiushiu.

168. Oxyambulyx canescens (Pl. IX. f. 5, ♂).

**Ambulyx canescens* Walker, *List Lep. Ins. B. M.* xxxi. p. 38 (1864) (Cambodia ;—Mus. Oxford) ; Butl., *Trans. Zool. Soc. Lond.* ix p. 581. n. 13 (1877) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p 24 n. 92 (1892) ; Kirby, *Cat. Lep. Het.* i. p. 676. n. 32 (1892).

Ambulyx argentata Druce, *Ent. Mo. Mag.* xix. p. 17 (1882) (Cochinchina ;—coll. Druce); Waterh., *Aid Ident. Ins.* ii. t. 136. f. 2 (1883) ; Kirby, *l.c.* i. p. 675. n. 14 (1892).

♂ ♀. Foretibia armed with some spines at and near the end. Hindtibia a little longer (in ♂ ½ mm., in ♀ 1½ mm.) than, long terminal spur barely two-thirds the length of, the first tarsal segment.

♂. The eighth abdominal sternite is deeply sinuate mesially, the edge of the segment is very oblique, each side very slightly and almost evenly convex from the most dorsal point to the bottom of the sinus. The harpe is the most peculiar in the genus (Pl. XXXI. f. 13), it being connected with the body of the clasper only at the base, as shown in the figure, which represents the clasper and harpe in a ventral view : the harpe is a very long, slightly twisted process, of which the apical third is rather suddenly narrowed and gently bent dorsad ; the two harpes lying across each other, as shown in the figure. The penis-sheath (Pl. XXX. f. 21) is armed apically with a process which is concave ventrally and armed with some teeth at the ventral edge : the process is apparently movable, being joined to the penis-sheath ; ventrally there is another armature consisting of an elongate, oblique patch of teeth a little before the distal edge of the sheath. The tenth tergite (the supra-anal hook) is very different from that of the other *Oxyambulyx*, where it is uniform in structure. In *canescens* the tenth tergite is longer than elsewhere in the genus, broad, mesially incised at the end (Pl. XXIII. f. 20), and the lateral edges are turned ventrad a little, the upper surface of the tergite being somewhat convex. In a lateral view (Pl. XXIII. f. 19) the tenth tergite is slightly curved ventrad. The tenth sternite (Pl. XXIII. f. 20) is in a ventral view triangular, sharply pointed ; in a lateral view (Pl. XXIII. f. 19) it resembles somewhat the blade of a knife, the mesial line of the sternite being raised into a thin but comparatively high carina, which is minutely denticulate. The membrane just above the anus (Pl. XXIII. f. 19. 20) is more strongly chitinised forming a short, smooth, brown bar.

♀. Eighth tergite (Pl. XV. f. 9) long, truncate, *not* sinuate. Vaginal plate (Pl. XV. f. 8) with a sinuate antevaginal ridge; at each side of the orifice there is a pointed curved process which has a rather close resemblance to the armature of *Polyptychus pygarga* ; postvaginal part of plate small, transversely folded.

Early stages not known.

Hab. Andamans ; Penang ; Cochinchina ; Cambodia ; Borneo.

In the Tring Museum 4 ♂♂, 1 ♀ from: Borneo ; Penang (C. Curtis); Andamans.

The specimen from the Saunders collection in the Hope Museum at Oxford came from Laos ; Walker said Cambodia.

169. Oxyambulyx subocellata.

Ambulyx substrigilis, Moore (*non* Westwood, 1848), in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 266. n. 612 (18. 7) (Java ; Canara).

**Ambulyx subocellata* Felder, *Reise Novara, Lep.* t. 76. f. 3 (♀) (1874) (Java ;—Mus. Tring) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 189. n. 12 (1875) (Cochinchina) ; Kirby, *Cat. Lep. Het.* i. p. 677. n. 44 (1892).

**Ambulyx moorei* Moore, *l.c.* sub n. 612 (1857) (=*substrigilis*) ; Butl., *Proc. Zool. Soc. Lond.* p. 10. n. 20 (1875) (Java ;—Mus. Brit.) ; Kirby, *l.c.* p. 676. n. 24 (1892) (partim).

**Ambulyx turbata* Moore, *Proc. Zool. Soc. Lond.* p. 252. n. 56 (1875) (Darjiling ; Canara ;—Mus. Brit.) ; Moore, *Lep. Ceylon* ii p. 11. t. 80. f. 1 (♀) (1882) (Ceylon) ; Swinh., *Proc. Zool. Soc. Lond.* 289. n. 22 (1885) (Belgaum) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 23. n. 124 (1887). (Sikhim ; Belgaum) ; Swinh., *Cat. Lep. Het. Or.* i p. 25. n. 100 (1892) (partim ; Upp. India).

**Ambulyx thwaitesi* Moore, *l.c.* ii. p. 11. t. 80. f. 2 (♂). 2a (*l*). 2b (*p*) (1882) (Ceylon ;—Mus. Brit.) : Cot. & Swinh., *l.c.* p. 24. n. 129 (1887) ; Swinh., *l.c.* p. 25. n. 96 (1892) (China).

Ambulyx semifervens, Hampson (*non* Walker, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 78. n. 104 (1892) (partim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 408. n. 103 (1898) ("not seen").
Ambulyx turbata Butl. var. *umbila* Huwe, *Berl. Ent. Zeitschr.* xl. p. 366. n. 37 (1895) (W. Java, 2000 ft.).

♂♀. On comparing the types of *subocellata*, *turbata*, *thwaitesi* and Butler's *moorei* (not the same as Boisduval's *moorei*, which has priority) we find that they belong to one species. The Malayan individuals which we have seen do not seem to present any constant character by which they could be distinguished from the Indo-Ceylonese ones. There is considerable individual variation in the markings both on the fore- and hindwing. The blackish olive stripe across the mesothoracic tegula is apparently never quite absent.——Foretibia with a few spines at and near apex exteriorly; hindtibia 1 to 2 mm. longer than, long apical spur three-fifths the length of, the first tarsal segment.

♂. Eighth abdominal sternite with an obtuse mesial lobe which is very faintly sinuate; the edge of the lobe internally incrassate to two tubercles which stand closely together, not being visible in a ventral view (Pl. XXII. f. 23). Harpe (Pl. XXXI. f. 10) extending basally from the ventral to the dorsal edge of the clasper, this ventro-dorsal ridge low, produced at end into a long pointed process which evenly curves ventrad; there is generally a tooth at the base of this hook; ventral part of harpe produced distad into an irregularly spatulate process, of which the upper edge is dilated into a large triangular tooth. Penis-sheath without external armature; duct with a ribbon-like organ which is densely beset with minute, sharply pointed, teeth (Pl. XXX. f. 1). Tenth sternite (Pl. XXIII. f. 13) separated into two lobes which are somewhat widened at end and incline towards each other.

♀. Eighth tergite mesially less chitinised than at sides, but not membranaceous, shallowly sinuate. Vaginal cavity (Pl. XV. f. 1) large, the ridge before it irregularly folded, mesially sinuate, continued laterad to the base of the tergite, lateral part higher, hollow at its ventral end, forming a kind of roof over the end of the lower ventral ridge.

Larva (fig. by Moore, *l.c.*) more slender than in *O. substrigilis*, horn long; a white dorso-lateral line from pronotum to horn, seven white oblique side-bands, a series of red dorso- and ventro-lateral patches, besides some lateral dots on the first segments, dorsal part of larva green between the white dorso-lateral lines, rest more whitish; edges of anal segment yellow.

Pupa (fig. by Moore, *l.c.*) insufficiently known, slenderer than in *substrigilis*.

Hab. Ceylon, N. India, China to Java and Borneo.

In the Tring Museum 18 ♂♂, 10 ♀♀ from: Ceylon; Sikhim (August); Khasia Hills (October); Andamans: Penang, May (C. Curtis); Benkoelen, W. Sumatra (Ericsson); Java.

170. Oxyambulyx semifervens.

**Basiana semifervens* Walker, *List Lep. Ins. B. M.* xxxi. p. 38 (1864) (Ternate;—Mus. Oxford); Butl., *Trans. Zool. Soc. Lond.* ix. p. 596. n. 6 (1877); Kirby, *Cat. Lep. Het.* i. p. 702. n. 4 (1892)
Ambulyx substrigilis, Pagenstecher (*non* Westwood, 1848), *Jahrb. Nass. Ver. Nat.* xli. p. 105. n. 197 (1888) (Amboina).
Ambulyx semifervens, Swinhoe, *Cat. Lep Het Mus. Ox.* i. p. 25. n. 95 (1892) (Ternate, *type*).
**Ambulyx amboynensis* Rothschild, Nov. Zool. i. p. 87 (1894) (Amboyna;—Mus. Tring).

♂♀. Wings broader than in *subocellata* and *dohertyi*; distal margin of forewing more convex, no subbasal spot before (SM^1); anal angle of hindwing less produced;

whitish marginal area of forewing below much broader. Mesothoracic tegula without greenish olive-brown stripe. Foretibia with very few spines.

♂. Eighth abdominal sternite mesially produced into a lobe which is bent dorsad and is shallowly sinuate, with the angles rounded (Pl. XXII. f. 22). Harpe (Pl. XXXI. f. 11) consisting of a distally raised ventral ridge and an oblique ventro-dorsal one, which ridges join distally; the dorsal hook of *subocellata* is absent. Penis-sheath as in *subocellata*. Tenth sternite differing in the two lobes not being so far apart and having a triangular shape (Pl. XXIII. f. 14).

Early stages not known.

Hab. Moluccas: Ternate; Amboina.

In the Tring Museum 3 ♂♂ from: Amboina.

The type of *semiferrens* differs from our Amboina specimens in the forewing having a black spot on the disc between M^1 and M^2, in the discal line of the hindwing being a little more distinctly double behind, in the underside being deeper tawny in the submarginal region of the forewing and in the marginal area of the hindwing, and in the tenth tergite being broader vertically at apex. Possibly there is a northern and a southern subspecies (*semif. semiferrens* and *semif. amboynensis*), as is mostly the case in the Lepidoptera of the Moluccas.

Subocellata, *semiferrens* and *dohertyi* apparently replace each other. It must be left to further researches based upon a larger material from more localities of the Papuan Subregion, to decide whether we have to do with three specifically distinct insects, or with two (one Indo-Malayan, the other Papuan), or only with one.

171. Oxyambulyx dohertyi.

Ambulyx turbata, Swinhoe (*nec* Butler, 1875), *Cat. Lep. Het. Ox.* i. p. 25. n. 100 (1892) (partim).

**Ambulyx dohertyi* Rothschild, Nov. Zool. i. p. 87 (1894) (Humboldt Bay, Dutch N. G.;—Mus. Tring); id., *l.c.* ii. t. 9. f. 5 (1895).

**Ambulyx annulifera* Swinhoe, *l.c.* (1892) (N. Guinea; nom. nud.:—Mus. Ox., haec spec. teste Jordan, 1902)

♂♀. Anterior tibia without spines; long terminal spur of hindtibia only one-fifth shorter than the first tarsal segment. Forewing with one subbasal postcellular spot, which is often constricted at SM^2, sometimes quite circular; apex as prominent as in *subocellata*, hinder margin longer and distal margin accordingly shorter than in the Indo-Malayan species. D^1 of hindwing shorter than D^2.

♂. Eighth sternite *not* lobed mesially, but sharply sinuate (Pl. XXII. f. 24). Tenth sternite (Pl. XXIII. f. 15) less deeply divided than in *subocellata* and *semiferrens*, the lobes closer together, either triangular or broadly rounded-truncate. Patch of friction-scales of clasper smaller than in *subocellata*, the scales larger, harpe (Pl. XXXI. f. 12) similar to that of *semiferrens*, shorter. Penis-sheath produced into an irregularly spoon-shaped process (Pl. XXX. f. 2), which is denticulate at the edge: the armature within the sheath similar to that of *subocellata* and *semiferrens*, but the teeth longer and fewer in number.

♀. Eighth tergite less minute than in *subocellata*. Vaginal plate with the edges of the vaginal cavity quite simple (Pl. XV. f. 2).

Early stages not known.

Hab. New Guinea and neighbouring islands; Solomon Islands.

Two subspecies:

a. O. dohertyi dohertyi.

**Ambulyx dohertyi* Rothschild, *l.c.*

♂♀. Greenish olive stripe across the mesothoracic tegula sharply defined,

broader than in *subocellata*, continued on to the metanotum, where the stripe is broad. Anal angle of hindwing strongly produced. Grey marginal area of forewing below reaching to M^1 or M^2.

♂. Tenth sternite with triangular lobes which are divergent (Pl. XXIII. f. 15); apex of harpe obtuse.

♀. See above.

Hab. New Guinea.

In the Tring Museum 5 ♂♂, 1 ♀ from: Humboldt Bay, Dutch N. G., September, October (W. Doherty); Dorey, June (W. Doherty): Kapaur, February (W. Doherty): Mt. Alexander to Mt. Nisbet, British N. G. (Anthony): Fergusson Island, December (Meek); Sudest, April (Meek).

The individual from Sudest is more greyish on the forewing than the others.

b. O. dohertyi salomonis subsp. nov.

♂. Meso-metanotum without greenish olive stripe, but with some white hair-scales indicating the edges of the stripe; submarginal line of forewing less regularly curved than in the New Guinea form, slightly undulate beyond R^2; white marginal area of underside beginning at SC^5 and stopping a little beyond R^3. Lobes of tenth tergite broad, close together; harpe more acutely triangular distally than in *doh. dohertyi*.

♀. Not known.

Hab. Guadalcanar, Solomon Is., April 1901 (A. S. Meek), 1 ♂ in the Tring Museum.

LII. RHADINOPASA.—Typus: *hornimani*.

Basiana, Druce (*non* Walker, 1856), *Ent. Mo. Mag.* xvi. p. 268 (1880).
Rhadinopasa Karsch, *Ent. Nachr.* xvii. p. 14 (1891) (type: *hornimani=udei*).
Rhadinopsis (!), Kirby, *Cat. Lep. Het.* i. p. 674 (1892).

♂♀. Tongue short and weak. A tuft of long hair-scales behind eye. Palpus long, but not projecting; second segment more than three times as long as broad, compressed, joint not open. Antenna slender, sub-andromorphic in ♀; end-segment short, penultimate one higher than long. Abdominal tergites densely spinose all over, apical spines more tawny, stronger chitinised. Tibiae *not* spinose; spurs very unequal, two pairs to hindtibia, long terminal spur about one-third the length of the first tarsal segment: tarsi very slender and long, hindtarsus half as long again as the cell of the hindwing measured along SC^1, first segment as long as the tibia, longer than the four others together, terminal segment rather shorter than the fourth. Distal margins of wings entire; apex of forewing truncate; D^2 of hindwing curved, not longer than D^3, lower angle of cell not very acute, costal margin convex, apex obtusely pointed. Clasper and eighth tergite without friction-scales.

Larva spinose (see below), with round head and short horn.

Pupa glossy, abdominal tergites punctured, densely so at the bases, sternites more smooth; cremaster short, obtuse, without tubercles or points; tongue-case much shorter than cases of forelegs.

Hab. West Africa.

One species.

Easily distinguished from *Clanis* and *Polyptychus* by the non-spinose tibiae and the truncate apex of forewing.

172. Rhadinopasa hornimani.

**Basiana hornimani* Druce, *l.c.* (1880) (Cameroons;—coll. Druce).
Basiana hornimanni (!), Holland, *Trans. Amer. Ent. Soc.* xvi. p. 66. n. 23. t. 3. f. 5 (♀). 6 (*p.*) (1889).
**Rhadinopasa udei* Karsch, *l.c.* p. 15. t 1. f. 4 (♀) (1891) (♀, Cameroons; ♀, Ashanti;—Mus. Berlin).
Rhadinopasa hornimani, id., *l.c.* p. 296. n. 11 (1891) (=*udei*); Auriv, *Ent. Tidskr.* xiii. p. 182. n. 230 (1891) (♂, Cameroons).
Rhadinopsis (!) *hornimani*, Kirby, *l.c.*

♂ ♀. Variable in size. Femora with a small tuft of black hairs near the tip.

♂. Tenth tergite broad, curved, flat, suddenly narrowed to a hook (Pl. XXIII. f. 21); sternite a low, trapezoidal, sinuate ridge. Clasper elongate, gradually narrowed to end (Pl. XXXII. f. 6); a dorso-basal process beset with setiferous tubercles as in *Clanis*; harpe represented by a curved, longitudinal, multi-denticulate ridge, reminding one of that found in *Clanis undulosa*. Penis-sheath without armature, as in *Clanis* and some species of *Polyptychus*.

♀. Not dissected.

Larva: Dr. W. J. Ansorge reared a specimen of this species from the caterpillar, and preserved, very fortunately, the last skin of the caterpillar as well as the shell of the chrysalis. The head, pronotum, legs and anal segment have apparently been red; head large, round, granulose, the granules higher and more dispersed laterally; thoracic and abdominal segments with many spikes, which are about 2 mm. long, regularly conical, smooth, pale, with dark tips, those on the penultimate segment nearly entirely black, anal segment with three spines above and two approximate ones at the apex. Pupated July 4th; imago, September 7th.

Pupa glossy; head rounded; sheath of tongue elongate-triangular, acute, ending 4 mm. short of tip of sheath of foreleg; mesonotum transversely rugose; metanotum narrowest in middle, the anterior margin being somewhat concave; abdominal tergites densely and deeply punctured in front, the punctures becoming smaller and scarcer behind, the sides smooth near the stigmata of segments 1 to 4, scarcely with any punctures; segments 5 to 7 transversely multicarinate at the bases before the stigmata, the carinae low but sharp, the interspaces concave, punctures all round the stigmata; eighth segment more smooth, not densely punctured at the base above, not carinate in front of the stigmata; punctures of sternites not so dense and deep as above, the punctured area more restricted.

Hab. West Africa: Ashanti country to Cameroons, doubtless more widely distributed. In several collections.

In the Tring Museum 2 ♂♂ from: Bipindi, Cameroons (Zenker); Akri Ugidi, Lower Niger (Dr. Ansorge).

LIII. METAMIMAS.—Typus: *australasiae*.

Sphinx, Donovan (*non* Linné, 1758), *Ins. N. Holl.* t. 33 (1805).
Acheromia, Boisduval (*non* Laspeyres, 1809), *Voy. Astrolabe, Lép.* p. 181 (1832).
Cocquosa Walker, *List Lep. Ins. B. M.* viii. p. 256 (1856) (partim: type: *triangularis*).
Brachyglossa Boisduval (*non* id., 1829), *Spec. Gén. Lép. Hét.* i. p. 10 (1875).
Metamimas Butler, *Trans. Zool. Soc. Lond.* ix. p. 582 (1877) (partim; type: *australasiae*).

♂ ♀. Tongue rather stout, but barely reaching end of forecoxa. Palpus slender, not much larger in ♂ than in ♀, narrow in ventral view, being compressed, projecting, pointed. Antenna slender, distal segments higher than long, end-segment

short, conical ; ♂ : segments compressed, rectangular in side-view ; ♀ : almost cylindrical, basal seriated ciliae rudimentary. Abdomen with spinules only at the edges of the tergites. Tibiae *not* spinose ; spurs short, *two* pairs to hindtibia ; pulvillus and paronychium present, the latter with two long thin lobes at each side ; tarsi heavily scaled Distal margins of wings entire, apex of forewing truncate ; SC^2 and R^1 of hindwing on a rather long stalk, D^2 very oblique, more or less curved, longer than D^3.

Early stages not known to us.

Hab. Eastern parts of Australia.

One species.

173. **Metamimas australasiae.**

Sphinx australasiae Donovan, *l.c.* t. 33. f. 1 (♀) (1805).
Acheroutia australasiae, Boisduval, *Voy. Astrolabe, Lép.* p. 181. n. 2 (1832) (Austral.).
Coequosa australasiae, Walker, *l.c.* viii. p. 257. n. 2 (1856) (N.S.W.); Misk., *Proc. Roy. Soc. Queensld.* viii. p. 22. n. 36 (1891) (Newcastle : Brisbane)
Brachyglossa australasiae, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 10. n. 2 (1875) (♂ : larva on *Banksia*).
**Brachyglossa banksiae* id., *l.c.* p. 11. n. 3. t. 3. f. 1 (1875).
Metamimas australasiae, Butler, *l.c.* ix. p. 582. n. 1 (1877) : Kirby, *Trans. Ent. Soc. Lond.* p. 237 (1877) ; id., *Cat. Lep. Het.* i. p. 701 n. 1 (1892).
Metamimas banksiae, Butler, *l.c.* p. 628 (1877).

♂ ♀. Basal area of forewing of ♂ more or less pale grey, while the wing of the ♀ is uniform in ground-colour.

♂. Tenth tergite (Pl. XXIII. f. 23) longitudinally impressed above, strongly chitinised, narrowed to a curved hook, distal portion carinate beneath, transsection prismatical, tip pointed; sternite a rather low, strongly chitinised ridge, which is somewhat bent upwards, faintly emarginate, minutely notched or granulose at the edge, with the sides rounded. Clasper large, rounded at apex, *without* patch of friction-scales, scales at and near dorsal edge very long ; harpe with two processes, both ventral, pointing obliquely upwards, one proximal of the other, subbasal, the upper edge of the more distal one continued dorso-basad as a low ridge (Pl. XXXI. f. 23). Penis-sheath *without* armature.

♀. Eighth tergite transverse, rounded-truncate, angles strongly rounded. Vaginal plate (Pl. XVI. f. 2) large, strongly chitinised, distal margin rounded, edge membranaceous ; orifice postmedian (*r*), situated at the end of a prominent mesial carina ; sides deeply concave.

Hab. Australia, eastern part.

In the Tring Museum 8 ♂♂, 18 ♀♀ from N. S. Wales and South Queensland.

LIV. COEQUOSA.—Typus : *triangularis.*

Sphinx, Donovan (*non* Linné, 1758), *Ins. N. Holl.* t. 33 (1805).
Acheroutia, Boisduval (*non* Laspeyres, 1809), *Voy. Astrolabe, Lép.* p. 181 (1832).
Brachyglossa id. (*non* id., 1829), *Spéc. Gén. Lép.* t. 12 B (1836).
Coequosa Walker, *List Lep. Ins. B. M.* viii. p. 257 (1856) (partim ; type: *triangularis*).
Cuequosa (!), Butler, *Trans. Zool. Soc. Lond.* ix. p. 597 (1877).

♂ ♀. Differs from *Metamimas* in the hindtibia having only one pair of spurs, in the retinaculum being absent and the frenulum vestigial, in the more rounded, not distinctly truncate, apex of the forewing, and in the less oblique upper cross-vein of the hindwing.

Larva granulose-spinose ; head triangular, no horn ; seven oblique side-bands, anal segment with a round, black, white-pupilled tubercle at each side.—Food-plant : *Banksia, Persoonia.*

Hab. Eastern parts of Australia.

One species.

Walker made a mistake in attributing four hindtibial spurs to both *australasiae* and *triangularis.*

174. Coequosa triangularis.

Sphinx triangularis Donovan, *l.c.* t. 33. f. 2 (1805).
Sphinx castaneus Perry, *Arcana* i. (1811).
Acherontia triangularis, Boisduval, *Voy. Astrolabe, Lép.* p. 181. n. 1 (1832) ; Feisth., *Voy. Faeurite* p. 18 (1839).
Brachyglossa triangularis, Boisduval, *Spec. Gén. Lép.* t. 12 n. f. 2 (♀) (1836) ; Blanch., *Hist. Nat. Ins.* iii. p. 480 (1841) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 9. n. 1 (1875).
Coequosa triangularis Walker, *l.c.* viii. p. 257. n. 1 (1856) (Moreton Bay) ; Scott, *Austr. Lep.* ii. p. 5. t. 10 (*l., p., i.*) (1890) (metam.) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 22. n. 37 (1891) (throughout east coast) ; Kirby, *Cat. Lep. Het.* i. p. 701. n. 1 (1892).
Caequosa (!) *triangularis*, Butler, *l.c.* ix. p. 597 (1877) (Moreton Bay).

♂ ♀. In Butler's Revision this species stands at the end of the "*Smerinthinae*" and *Metamimas australasiae* at the beginning.—It is apparently a rather common species. It does not vary much in colour, but somewhat in the sexual armature.

♂. Tenth tergite longitudinally impressed, slender, curved downwards, not divided, widened at apex ; sternite with a mesial lobe which is broader than long, and is strongly or moderately rounded. Clasper as broad as in *Metamimas* ; harpe relatively short, with two processes, one at the end, the other dorsally before the end, both curved upwards (Pl. XXXI. f. 24), reminding one of the harpe of *Herse* and *Acherontia*. Penis-sheath carinate dorsally.

♀. Eighth tergite rather longer than in *M. australasiae*, mesially feebly emarginate. Vaginal plate (Pl. XVI. f. 1) very different from that of *M. australasiae* ; orifice median, very large, its proximal and lateral edges strongly chitinised, but the rest of the antevaginal part of the plate membranaceous ; this edge with some tubercles which bear single long hairs ; posterior edge of orifice also somewhat raised ; postvaginal part of plate transverse, triangular mesially, apex slightly sinuate.

Larva see above ; it mimics perhaps some kind of chameleon or lizard.

Hab. Eastern parts of Australia : Queensland ; New South Wales.

In the Tring Museum 8 ♂♂, 6 ♀♀ from New South Wales, one larva.

LV. CLANIS.—Typus : *phalaris.*

Sphinx, Cramer (*non* Linné, 1758), *Pap. Ex.* ii. p. 83 (1777).
Clanis Hübner, *Verz. bek. Schm.* p. 138 (1822) (partim ; type : *phalaris=nicobarensis*).
Basiana Walker, *List Lep. Ins. B. M.* viii. p. 236 (1856) (partim ; type : *deucalion*).
Metagastes Boisduval, *Spec. Gén. Lép. Hét.* i. p 11 (1875) (type : *phalaris*).
Ambulyx, Hampson (*non* Walker, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 77 (1892).

♂ ♀. Tongue rather stout, but not reaching beyond the hindcoxa. Pilifer with bristles. Palpus incrassate distally, rather prominent in ♂, joint not open. Antenna setiform, segments prismatical in ♂, the seriated ciliae short in and near the mesial line, segments circular in transsection in ♀, with very slightly prolonged

basal and apical ciliae: the end-segment is short. Abdomen with many weak spines dorsally underneath the ordinary scaling, apical spines of segments numerous. Tibiae *spinose*; spurs unequal, *two* pairs to hindtibiae; pulvillus and paronychium present, the latter with two lobes, of which the upper one is very slender. Distal edge of wings entire; frenulum and retinaculum present.

♂. Clasper and seventh tergite without organ of friction; the former with dorso-basal tuberculated process (Pl. XXXII. f. 10, *pa*); penis-sheath without armature.

♀. A large postvaginal plate (Pl. XVI. f. 3.—13), which is strongly chitinised and projects distad.

Larva green, with oblique white side-stripes, granulose, head triangular in early stages, large and round in later stages.—Food-plant: *Butea frondosa* (and probably other plants).

Pupa (of *phalaris*) insufficiently figured, not described.

Hab. Japan to Ceylon, eastwards to Timor; not yet found on the larger Sunda Islands, the Philippines, Malacca.

The specimens fade more or less as long as they are on the wing, fresh individuals being redder than those caught after the wings have been exposed for some time to damp and light.

There are six Asiatic and one African species, the latter deviating obviously from the Asiatic type.

Key to the species:

a.	Forewing below with a black streak behind the cell	*b.*
	Forewing below without a black streak behind the cell	*d.*
b.	Midtibia white above like the hindtibia . .	175. *Cl. bilineata.*
	Midtibia not white above	*c.*
c.	Forewing above with a pale costal area and a pale line before R^3, long terminal spur of hindtibia more than half the length of the first tarsal segment	176. *Cl. undulosa.*
	Forewing above without pale costal area and pale line, spurs shorter, very unequal .	177. *Cl. deucalion.*
d.	Midtibia with white streak on upperside like hindtibia	*e.*
	Midtibia without white streak on upperside .	*f.*
e.	Large species, head not black in front . .	180. *Cl. titan.*
	Smaller species, head black in front . .	178. *Cl. euroa.*
f.	Forewing with pale costal patch and pale line before R^3	179. *Cl. phalaris.*
	Forewing almost unicolorous	181. *Cl. bicolor.*

175. Clanis bilineata.

**Ihasiana bilineata* Walker, *List Lep. Ins. B. M.* xxxv. p. 1857 (1866) (Darjiling;—Mus. Brit.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 50. n. 7 (1875) (Darjiling); Butl., *Trans. Zool. Soc. Lond.* ix. p. 595. n. 2 (1877) (Darjiling; Shanghai); Kirby, *Cat. Lep. Het.* i. p. 702. n. 1 (1892) (Darjiling); Leech, *Trans. Ent. Soc. Lond.* p. 280. n. 45 (1898) (partim).

Clanis bilineata, Butler, *Illustr. Typ. Spec. Lep. Het. B. M.* v. p. 14. t. 81. f. 4 (1881) (Darjiling); Cotes & Swinh., *Cat. Moths Ind.* i. p. 29. n. 2 (1887) (Sikhim; Darjiling); Fixs., in Rom., *Mém. Lép.* iii. p. 322. n. 98 (1887) (Corea, viii.); Leech, *Proc. Zool. Soc. Lond.* p. 587. n. 28 (1888) (partim; Yokohama).

Clanis deucalion, Swinhoe, *Cat. Lep. Het. Ox.* i. p. 29. n. 116 (1892) (partim).

Ambulyx bilineata, Hampson, *Fauna Brit. Ind., Moths* i. p. 80. n. 110 (1892) (Shanghai; Sikhim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 408. n. 110 (1898) (Sikhim, vi. and viii.).

♂ ♀. Mid- and hindtibia white above; the latter in ♂ as long as, in ♀ 2 mm. longer than, the first tarsal segment; spurs very unequal, short ones less than half the length of the long ones, these not quite half the length of the first tarsal segment. Forewing below with black streak behind the cell, hinder margin in ♂ about as long as, in ♀ 4 to 6 mm. longer than, distal margin: the pale costal area on the forewing above distinct.

♂. Tenth abdominal tergite (Pl. XXIII. f. 24) very different from that of all the other species, its apical half being very strongly narrowed with the apex *not* sinnate; the underside of this narrow portion is strongly chitinised, having the appearance as if the sides of the tergite, instead of being spread out laterad, were bent downwards and had become fused together in the mesial line; the tip of the tergite is curved ventrad (Pl. XXIII. f. 28), forming a hook which is vertically thicker (side-view) than in the allied species, owing to the under surface slanting from each side towards the raised mesial line (*c*); sternite also very remarkable, being produced into two long processes (Pl. XXIII. f. 24). The harpe (Pl. XXXII. f. 11) consists of a ventral triangular ridge *pc*, which is subvertical upon the plane of the clasper and covered for the greater part with small scales; the submesial ridge *cm* is basally produced into a compressed process *pb*, while it fades away distally into the vermicular folding of the clasper; the dorso-basal process *pdb* is slender, curved, apically dilated and here beset with bristle-bearing tubercles.

♀. The eighth tergite very different from that of the other species in being deeply divided by a narrow sinus (Pl. XVI. f. 5. 6), the two lobes more or less notched or irregularly emarginate. The vaginal plate also characteristic (Pl. XVI. f. 4. 5): the vaginal orifice (*c*) mesial, surrounded proximally and laterally by a fold, at each side of the orifice there is a groove bordered by a fold; the postvaginal plate very broadly rounded, almost truncate, extremely feebly emarginate mesially; fig. 5 gives a side-view of the end of the abdomen, showing the relative position of the dorsal and ventral plates; the anal cone (consisting of segments ix. and x.) is somewhat pushed anad to make it visible.

Early stages not known.

Hab. North India to Corea and Japan; the commonest species of this genus.

In the Tring Museum 15 ♂♂, 7 ♀♀ from: Calcutta; Assam; Sikhim; Japan.

176. Clanis undulosa.

**Clanis undulosa* Moore, *Proc. Zool. Soc. Lond.* p. 387 (1879) (N. China, ♀;—coll. Staudinger).

Clanis bilineata, Leech (*non* Walker, 1856), *Trans. Ent. Soc. Lond.* p. 119. n. 94 (1889) (Kiukiang).

Basiana undulosa, Kirby, *Cat. Lep. Het.* i. p. 702. n. 2 (1892) (N. China).

**Clanis giyantea* Rothschild, Nov. Zool. i. p. 96 (1894) (partim; Khasia Hills, ♂, ♀ *alia spec.*;—Mus. Tring).

Ambulyx bilineata, Hampson, in Blanf., *Fauna Brit. Ind., Moths* iv. p. 453 (1896).

Basiana bilineata, Leech, *l.c.* p. 280. n. 45 (1898) (partim).

♂ ♀. Underside of femora, innerside of anterior tibia and tarsus, upperside of mid- and hindtarsi and of antenna pink, upperside of midtibia and outerside of all

tibiae blackish ; hindtibia of ♂ longer than, of ♀ as long as, the first tarsal segment ; spurs longer than in the other species of *Clanis*, the short ones over half the length of the long ones, those of the apical pair of the hindtibia not so widely different in length as in the other *Clanis*, the longer one more than half the length of the first tarsal segment. Wings more elongate than in any other species of this genus. Distal margin of forewing in ♂ longer, in ♀ very little shorter, than the inner margin ; the lines of lunules of the forewing on the whole stronger marked than in *bilineata*, with which the species has been confounded by Leech and Hampson ; there are in some specimens four such lines between the cell and the postdiscal line which begins at the apical patch ; the black area of the hindwing is more extended than in *bilineata*.

♂. The tenth tergite (Pl. XXIV. f. 3) is sinuate at the end, the lobes curved downwards and pointed, with the edges irregularly notched ; in a lateral view (Pl. XXIII. f. 27) the lobe appears rather dilated before the apex, convex. The sternite (Pl. XXIV. f. 3) is membranaceous laterally, the mesial lobe is subtruncate, trapeziform, with the edges somewhat rounded. The harpe (Pl. XXXII. f. 8) consists of a submesial ridge *cm*, which is deeply curved twice and distally raised to a flattened process, which curves basad and somewhat resembles the process of *titan* ; the dorsal process *pd* is short and broad, and beset with rough warts, which bear each a short bristle.

♀. The eighth tergite (Pl. XVI. f. 8) is short, broadly sinuate, the sinus rounded, the sides projecting, rounded. The vaginal orifice (Pl. XVI. f. 9) is surrounded by two folds ; the postvaginal plate is broadly rounded.

Early stages not known.

Hab. North China to North India.

In the Tring Museum 5 ♂♂, 1 ♀ from : Khasia Hills ; Sikhim.

Chinese specimens in the collections of Charles Oberthür, de Joannis, and Dr. O. Staudinger, and in the British Museum.

The species is generally larger than *bilineata*, but it varies in size ; it is easily distinguishable from *bilineata* by the longer wings and the black midtibia and long spurs, besides the structure of the end of the abdomen.

177. Clanis deucalion.

Bazisna deucalion Walker, *l.c.* viii. p. 237. n. 1 (1856) (N. India, ♀ ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 48. n. 1 (1875) ("Himalaya" !) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 595. n. 1 (1877) (N. India) ; Kirby, *Cat Lep. Het.* i. p. 702. n. 5 (1892) (N. India).

Clanis deucalion, Butler, *Illustr. Typ. Spec. Lep. Het.* v. p. 15. t. 81. f. 5 (1881) (N. India) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 29. n. 158 (1887) (Shillong ; this spec. ??) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 29. n. 116 (1892) (partim).

Clanis deucalion ?, Forsayeth, *Trans. Ent. Soc. Lond.* p. 394 (1884) (Mhow).

Ambulyx deucalion, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 80. n. 111 (1892) ("Shillong" ex err.).

♂♀. The type of this species is a ♀ which has only one leg left out of the six, and this is a foreleg without tarsus. The specimen agrees in the shape of the eighth abdominal tergite well with *undulosa*, not at all with *bilineata* : the vaginal plate we have not dissected out, for fear of breaking the rather old and brittle specimen. In colour the individual comes very near *undulosa*, differs, however, in the following points : the forewing, which is much less elongate than in *undulosa*, bears three sharply marked dentate lines on the disc, equidistant from each other and from cell and the postdiscal, indistinct, line which begins at the

apical patch ; there is no pale line before R^3 and no pale costal area. The black patch on the hindwing is restricted, longer at SM^2 than at R^3, and appears sinuate between M^1 and SM^2 ; there are tawny brown scales between this patch and the apex of the wing. The individual came from N. India, and has no more precise locality. A ♂ in the Oxford Museum from E. India (Hutton) agrees well with this ♀. Another ♂ in the British Museum, from the Leech collection, obtained by Captain Young at Kulu, belongs doubtless to this species. It is very pale, as pale as the palest *phalaris*. It agrees with *undulosa* in the midtibiae *not* being white above like the hindtibia and in the presence of a black streak on the underside of the forewing. The specimen is comparatively small, the forewing measuring only 47 mm. in length ; the lines of the forewing are scarcely traceable, the black patch of the hindwing is still more restricted than in the type of *deucalion*, the black scaling not extending beyond the end of the cell between R^3 and SC^2, while the area between cell and apex of wing is shaded with pale tawny. The two *males* differ structurally from *undulosa* in the following points : the hindtibia is as long as the first tarsal segment, and this barely longer than segments 2 to 5 together ; the terminal pair of spurs is very unequal, shorter than in *undulosa*, the long one only half the length of the first tarsal segment. The genital armature is as in *undulosa*, but the lobes of the tenth tergite are somewhat slenderer, and the sternite is rounded.

The shorter distal margin of the forewing, the reduced, sinuate, black patch of the hindwing, the absence from the forewing of a pale costal area and of a white line before R^3, the shorter spurs of the hindtibia, and shorter first hindtarsal segment, are the principal characters by which this species can be distinguished from *undulosa*.

The larva mentioned by Forsayeth, *l.c.*, may belong to this or some other species.

Hab. N. and N.W. India.

In the British Museum 1 ♂, 1 ♀ from N. India and Kulu. In the Oxford Museum 1 ♂ from E. India. Not seen in other collections.

178. **Clanis euroa** spec. nov.

♂ ♀. In colour and pattern and the proportions of the tibiae, spurs and tarsi close to the much larger *Cl. titan*. Differs as follows : front of head and end of palpus blackish, black mesial line of occiput and collar heavier ; distal margin of forewing in both sexes about 6 mm. shorter than internal one, the distal edge of the pale area of the forewing more oblique between R^1 and R^2, the blackish line proximally of subcostal fork reaching down to R^3, not developed to a large cloud or patch, the following line barely indicated, the line halfway between fork and apical patch rather stronger marked than in *titan*. On the *underside* only the external one of the three discal lines of the forewing is indicated, and there is on the hindwing just a faint trace of the middle one of the three lines.

♂. The differences in the sexual organs of the ♂ are very marked ; the harpe (Pl. XXXII. f. 9) is raised to a low submesial ridge *cm*, which fades away distally into the irregular folding of the inner sheath of the clasper, and which ends proximally in a pointed small tubercle. The dorsal process *pd* of the clasper is similar to that of *phalaris*. The tenth tergite (Pl. XXIV. f. 2) is deeply sinuate, the lobes are much broader than in *titan* and less sharply hooked (Pl. XXIII. f. 26) ; the sternite is truncate, with the angles rounded and somewhat curved dorsad.

♀. The eighth abdominal tergite resembling that of *phalaris*, but the sides are more produced distad. Vaginal plate (Pl. XVI f. 13) with a transverse fold in front of the orifice, the fold incrassate before the orifice; postvaginal plate narrowing distally, truncate.

Length of forewing: ♂, 55-60 mm.; ♀, 22-24 mm.

Breadth of forewing: ♂, 61 mm.; ♀, 25 mm.

Hab. Oinanisa, Dutch Timor, November to December 1891 (W. Doherty).

2 ♂♂ 1 ♀, in the Tring Museum; *type*: ♂.

This may be only a geographical representative of *titan* in spite of the great differences in the sexual armature; intergradations may occur in the more western parts of the Malayan Subregion, where no *Clanis* have been found as yet.

179. Clanis phalaris.

Sphinx phalaris Cramer, *Pap. Ex.* ii. p. 83. t. 149. f. A (1777) (Coromandel).

**Sphinx pagana* Fabricius, *Spec. Ins.* ii. p. 146. n. 29 (1781) (Ind. or., Mus. Banks; —Mus. Brit.); id., *Mant. Ins.* ii. p. 95. n. 32 (1787); Gmel., *Syst. Nat.* i. 5. p. 2385. n. 92 (1790) (India); Fabr., *Ent. Syst.* iii. 1. p. 366. n. 34 (1793).

Sphinx nicobarensis Schwarz, *Nomencl. Rocs. & Kleem.* ii. p. 1. t. 1. f. 1. 2 (1810); Charp., in Esp., *Ausl. Schm. Suppl.* t. 1. f. 1 (1830).

Clanis nicobarensis, Hübner, *Verz. bek. Schm.* p. 138. n. 1480 (1822).

Clanis phalaris, id., *l.c.* n. 1481 (1822); Moore, *Proc. Zool. Soc. Lond.* p. 595 (1877) (Pt. Blair, = *pagana* = *nicobarensis*); Kirby, *Cat. Lep. Het.* i. p. 702. n. 1 (1892) (India; Nicobars; "Schall. Naturf." etc. ex err.).

**Basiana cervina* Walker, *List Lep. Ins. B. M.* viii. p. 237. n. 2 (1856) (partim; N. Ind.; —Mus. Brit.); Horsf. & Moore, *Cat. Lep. Mus. E. I. C.* i. p. 265. n. 611 (1857); Moore, *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal); Boisd., *l.c.* p. 48. n. 2 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 596. n. 5 (1877); Swinh., *Proc. Zool. Soc. Lond.* p. 135. n. 13 (1886) (Mhow, vii.); Kirby, *Cat. Lep. Het.* i. p. 702. n. 3 (1892).

Coequosa (?) *phalaris*, Walker, *lc.* p. 258. n. 3 (1856).

Sphinx (?) *pagana*, id., *l.c.* p. 264 (1856).

Metagastes phalaris, Boisduval, *Spec. Gén. Hét. Lép.* i. p. 12. n. 1 (1875) (Ind. or.).

Metagastes nicobarensis, id., *l.c.* n. 2 (1875).

Clanis nicobarensis, Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 14 (1881).

Clanis cervina, id., *l.c.* p. 15. t. 81. f. 6 (1881); Fors., *Trans. Ent Soc. Lond.* p. 393. t. 15. f. 1. 2. (larva, pupa) (1884) (Mhow); Cot. & Swinh., *Cat. Moths Ind.* i. p. 29. n. 160 (1887).

Clanis nicobaricnsis (!), Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 29. sub n. 118 (1892).

Ambulyx pagana, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 80. n. 112 (1892) (Sikhim); Bengal; Madras); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 409. n. 112 (1898) (not seen).

♂ ♀. This species varies a good deal in the tint of the ground-colour, some specimens being much more red than others; the lines of the forewing vary also, being sometimes more, sometimes less distinct. Cramer's figure applies to this species, not to what we have described below under the name of *titan*. Though the figure is very grossly executed, it shows nevertheless one essential character of *phalaris* = *nicobarensis*. In this species, namely, the pale area of the upperside of the forewing expands in the submarginal region between SC^5 and R^2, while in *titan* it is much narrower, expanding only between SC^5 and R^1. It is quite possible that there are several subspecies of this species, but with the material at present at disposal it is scarcely safe to form an opinion upon this point. We have examined the genital armature of several specimens from North and South India and Ceylon, and did not find any reliable difference. The specimens described by Walker as *cervina*—we have dissected the ♂—are very pale, the pale costal area of the forewing and the line before R^3 consequently being hardly discernible; there is no black streak on the underside of the forewing, and no white line

upon the upperside of the midtibia. The structure being the same as in *phalaris*, we cannot entertain any doubt that *cervina* is specifically the same as *phalaris*. Other North Indian individuals are much redder and the pattern of the forewing is more obviously marked.

The species can be distinguished by the following characters : . .

♂♀. Midtibia not white above like the hindtibia ; this nearly as long as the first and second tarsal segments together ; short spurs not half the length of the long ones, these not half the length of the first tarsal segment. Distal margin of forewing about 3 mm. shorter than the inner margin in both sexes. The pale costal area of the forewing distally limited behind by vein R^2, always extending beyond R^1.

♂. Tenth abdominal tergite similar to that of *titan* (Pl. XXIV. f. 1), but the two apical hooks proportionally longer ; the sternite resembling that of *euroa* (Pl. XXIV. f. 2), but mesially more rounded, as regards outline standing about midway between the sternites of *euroa* and *titan*. The harpe (Pl. XXXII. f. 10) consists of a ventro-submesial plate which is raised into a submesial ridge *cm* ; this ridge is basally prolonged into a sharply pointed long hook *pb*, and distally into a broad, apically rounded process which is somewhat concave on the broad side ; the edge of this process is raised distally and ventrally, running down to near the edge of the clasper, while on the underside the process bears a fold *f*, which connects it with the inner sheath of the clasper, the fold disappearing in a patch of very irregular, strongly curved, small folds ; the dorsal process *pd* of the clasper is ribbon-like on the upperside, rather pointed ventrally at the end and irregularly denticulate ; between this process and the harpe there is a rather conspicuous fold.

♀. The eighth tergite (Pl. XVI. f. 10) is swollen and rounded laterally ; it does not project distad over the scale-bearing membrane. Vaginal plate (Pl. XVI. f. 3) with a transverse fold before the vaginal orifice ; the postvaginal part of the plate projecting distad as in the other species, its apical margin shallowly sinuate.

Larva green, with oblique whitish side-bands, granulose, granules especially large on head, legs, and anal segment. Young : head triangular, horn long. Adult : head very large, round, horn reduced to a short triangular lobe.

Pupa figured, but not described ; of the ordinary type, special characters not known.

Hab. North India (Sikhim) to Ceylon and the Nicobar Islands.

In the Tring Museum 2 ♂♂, 5 ♀♀ from : Ceylon ; Sikhim.

Occurs most likely also in N.W. India.

189. **Clanis titan** spec. nov.

Bastana cervina Walker, *l.c.* viii. p. 237. n. 2 (1856) (partim, ♀).
Bastana phalaris, Butler (*non* Cramer, 1777), *Trans. Zool. Soc. Lond.* ix. p. 596. n. 4 (1877) (partim).
Ambulyx phalaris, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 79. n. 109 (1892) (Sikhim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 408. n. 109 (1898) (not seen).
Clanis gigantea Rothschild, Nov. Zool. i. p. 96 (1894) (♀, not ♂ ; Sikhim).

♂♀. Mid- and hindtibia white above (in *phalaris* the midtibia *not* white), the latter as long as (♂), or (♀) 1 mm. longer than, the first tarsal segment ; short spurs barely one-third of the long ones, little longer than the tibia is broad. Scaling of antenna pale pink ; frons and end of palpus very little darker than the sides of the occiput.

Wings, *upperside*.——Forewing : distal margin about 1 mm. shorter than

internal one in ♂, 7 mm. in ♀ ; chestnut, paler and somewhat pinkish towards base, a large vinaceous-cinnamon patch expanded between costal margin and R^3, extended to distal margin between veins SC^5 and R^1, not between SC^5 and R^2 as in *phalaris*; the transverse lines not dentate ; a broad subbasal line about 5 mm. from the base of M^2, distinct, another almost parallel with it a little distal of M^2, indistinct, some traces of lines between this and internal angle ; within the pale area there is a large brown patch or cloud, representing two lines, situated upon the subcostal fork ; another line between this cloud and the apical patch.——Hindwing as in *phalaris*, but the basal area darker chestnut.

Underside as in *phalaris*, the transverse lines of the forewing less distinct : the middle line of the hindwing close to the proximal line, the interspace partly filled up with scaling of the same colour as the lines.

♂. Tenth abdominal tergite (Pl. XXIV. f. 1) very broad, apex very broadly but not deeply sinuate, the two lobes slender, strong, pointed, curved downward, forming a hook, which is represented in side-view by Pl. XXIII. f. 25 ; sternite (Pl. XXIV. f. 1) rounded. The harpe consists of a curved subventral ridge (Pl. XXXII. f. 7, *cm*), which is distally produced into a broad, strongly chitinised flap with irregular teeth at the edge, the flap curving proximad ; the dorsal process *pd* of the clasper is short and very broad, and bears scarcely any setiferous tubercles, the few bristles at its edge being nearly all inserted in the usual way in punctures : the interspace between the harpe and the dorsal process is filled up with very high and very thin lamellae of the inner membrane of the clasper (only one ♂ seen) ; the ventral edge of the clasper clothed with short bristles.

♀. The eighth abdominal tergite (Pl. XVI. f. 11) strongly chitinised, long, very feebly bi-emarginate, projecting, the angles strongly rounded, the sides convex. Vaginal plate short, a short curved ridge in front and at the sides of the orifice, postvaginal part of plate truncate, with the angles strongly rounded and the sides slanting (Pl. XVI. f. 12).

Length of forewing : ♂, 72 mm. ; ♀, 79 mm.

Larva and pupa not known.

Hab. North India.

In the Tring Museum 1 ♂, 1 ♀ from the Khasia Hills (♂, *type*), and Sikhim (Mandelli, ex coll. Felder).

In the British Museum 1 ♀ from Sikhim. Not seen in other collections.

181. **Clanis bicolor** (Pl. LXVI. f. 6, ♀).

**Clanis bicolor* Rothschild, Nov. Zool. i. p. 96 (1894) (hab.? ;—Mus. Tring).

♂. Not known.

♀. We have recently received from Sierra Leone a ♀ which agrees essentially with the type, though it is much larger. The species is not a typical *Clanis*, the palpus being too small for that genus, and the spurs of the midtibia—the hindtibiae are missing in both specimens—are too short. But in the absence of the ♂, the species is best left where it was originally placed. The cross-veins of the hindwing are transverse, not obviously oblique, D^2 is almost twice the length of D^3, both the upper and lower angle of the cell about 90°. Eighth tergite sinuate. Vaginal plate (Pl. XVI. f. 7) with an asymmetrical transverse fold before the orifice, produced into two long, slender, pointed lobes ; postvaginal plate rounded-triangular

Early stages not known.

Hab. West Africa : Sierra Leone.

Two ♀♀ in the Tring Museum : the type (figured) without locality. Not seen in other collections.

LVI. PSEUDOCLANIS.—Typus : *postica*.

Basiana Walker, *List Lep. Ins. B. M.* viii. p. 237 (1856) (partim ; type : *deucalion*).
Smerinthus, Lucas (*nōn* Latreille, 1802), *Ann. Soc. Ent. Fr.* p. 606 (1857).
Zonilia Walker, *l.c.* xxxi. p. 34 (1864) (partim).
Ambulyx, Mabille (*non* Walker, 1856), *Bull. Soc. Philom.* (7). iii. p. 135 (1879).
Clanis, Druce (*non* Hübner, 1822), in Moloney, *West Afric. Forestry* p. 493 (1887).
Pseudoclanis Rothschild, Nov. Zool. i. p. 96 (1894) (type : *postica*).
Pseudosmerinthus, Karsch (*non* Butler, 1877). *Ent. Nachr.* xxvi. p. 370) (1900).

♂♀. Tongue much shorter than in *Clanis*. Joint of palpus open as in *Polyptychus*. Abdominal tergites spinose all over. Tibiae spinose ; two pairs of spurs to hindtibia ; pulvillus and paronychium present. No friction-patch on clasper. Distal margins of wings entire, apex of forewing produced ; hindwing yellow or red, with large conspicuous black basal patch.

Early stages not known.

Larva presumably spinose and with rounded head.

Hab. Africa and Madagascar.

Differs from the species of *Polyptychus* with falcate forewings in the weak tongue. Some of the species dealt with under *Polyptychus*—for instance *pygarga* and allies—will perhaps ultimately come into this genus ; but we leave them there for the present, confining *Pseudoclanis* to the species with a large black basal patch on the hindwing, which will enable also those lepidopterists who do not go closely into the structure of the insects to locate correctly any new species.

Key to the species :

Hindwing red, without black postdiscal band .	182. *P. karschi*.
Hindwing yellow, with black postdiscal band .	183. *P. postica*.
Hindwing pinkish grey, with black postdiscal band	184. *P. grandidieri*.

182. **Pseudoclanis karschi** spec. nov.

♀. A broad-winged insect. Apex of forewing produced into a long blunt hook ; distal margins entire, that of forewing convex between R^2 and SM^2. Tibiae spinose. Head, thorax, and basal segments of abdomen olive-green above, rest of abdomen and underside clay-colour, legs olive-brown.

Wings, *upperside*.——Forewing olive-green ; three darker green lines in basal half, running obliquely from costal to inner margin, the first reaching inner margin before middle, the second in middle, the second and third converging behind ; an indistinct median line, convex from upper angle of cell to R^3, then continued from lower angle of cell to inner margin, followed by another line between costal margin and R^3 ; a yellowish green discomarginal area bordered by the median line and R^3 ; apex of wing of the same colour ; an oblique brown line from tip of SC^5 to R^2 bordering a brownish submarginal space.——Hindwing rosy red ; a large black basi-discal patch behind the cell ; abdominal fold dirty grey ; marginal area yellowish olive-green.

Underside.——Forewing : basal half rosy red, except costal and inner margins, rest of wing yellowish olive-green ; a broad glossy discal band from costal margin to beyond R^2, a large triangular submarginal space of the same colour proximally bordered by an oblique blackish line.——Hindwing shaded with buff ; a large rosy red patch between cell and abdominal margin, three yellowish green lines across the disc : the first straight, 5 mm. from cell at R^1, the second also straight, the third dentate behind, the lines nearly equidistant.

Vaginal plate (partly visible in *type*) with a high, almost rectangular, ridge : the corners sharp, somewhat produced, distal edge truncate-sinuate. Eighth tergite truncate, angles very strongly rounded.

Length of forewing : ♀, 68 mm.

♂ and early stages not known.

Hab. Victoria, Cameroons, 1 ♀ in the Berlin Museum.

Named in honour of Professor Karsch.

183. Pseudoclanis postica.

**Basiana postica* Walker, *List Lep. Ins. B. M.* viii. p. 237. n. 3 (1856) (Natal ;—Mus. Brit.).
Pseudoclanis postica, Rothschild, Nov. Zool. i. p. 97 (1894).

♂ ♀. Tongue short and weak. Joint of segments 1 and 2 of palpus naked, open. Antennal segments of ♀ somewhat compressed ventrally, transsection subtriangular, basal rows of ciliae distinct. Distal margins of wings entire ; D^2 of hindwing very oblique, twice as long as D^1. Tenth abdominal tergite of ♂ deeply divided into slender, hooked, pointed lobes (Pl. XXIV. f. 6. 7. 8) ; sternite membranaceous, without lobes or processes. Clasper very broad, divided apically ; harpe produced distally into a long process (Pl. XXXII. f. 12. 13). No friction-patch upon clasper, but the scales at the end of the eighth tergite curved inwards. Penis-sheath (Pl. XXX. f. 25) with an arched belt of teeth which reaches the apical edge at one side and is continued on the membranaceous duct. Eighth tergite of ♀ (Pl. XVI. f. 16) sinuate, with two or more teeth ; vaginal plate produced at each side of the cavity into a curved, pointed or dentate, process (Pl. XVI. f. 14. 15). The lines and bands of the forewing are more pronounced in fresh specimens ; the two straight double bands in the basal half which run obliquely distad from the costal to the inner margin are more distinct in the ♀ than in the ♂. Besides the large basal patch and the postdiscal band, which follows the curve of the distal margin, there are in some specimens vestiges of black discal lines. Distal margin more convex in ♀ than in ♂.

Early stages not known.

Hab. Africa, from Sierra Leone and Abyssinia to Cape Colony.

Said to produce a sound as *Acherontia*.

Three subspecies :

a. P. postica postica.

**Basiana postica* Walker, *l.c.* (Natal) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 50 n. 6 (1875) (Natal) ; Wallengr., *Öfv. Vet. Ac. Handl.* xxxii. 1. p. 94 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 596. n. 8 (1877) (Natal) ; Kirby, *Cat. Lep. Het.* i. p. 702 n. 7 (1892) (partim : Natal).
Pseudoclanis postica, Rothschild, *l.c.*

♂ ♀. Distal margin of forewing slightly convex between R^1 and M^2 in both sexes. Black postdiscal band of hindwing interrupted in most specimens, sometimes represented only by vein-dots.

♂. The two slender processes of the tenth tergite form each a moderately curved hook (Pl. XXIV. f. 6; side-view). Clasper (Pl. XXXII. f. 13) sinuate at the apex, the sinus continued proximad by the vestige of a slit; proximal part of harpe very bulky, filling up the greater part of the cavity of the clasper, produced distally into a rather long and slender process which is somewhat curved at the end. The teeth of the penis-sheath (Pl. XXX. f. 25) well developed on one side (left-hand side in fig.), the mesial ones being a little heavier, while the teeth disappear more or less from the other side of the sheath.

♀. Eighth abdominal tergite with two pointed processes at the sides of the mesial sinus, the processes variable in length. Vaginal plate (Pl. XVI. f. 14) with a prominent folded and dentate transverse ridge before the vaginal cavity, the ridge sinuate mesially, laterally joining the broad dentate side-processes, which curve mesiad.

Hab. Cape Colony to British East Africa.

In the Tring Museum 10 ♂♂, 4 ♀♀ from: Natal; Taveta; Escarpment, British East Africa, February and March 1901 (W. Doherty).

b. P. postica abyssinicus.

**Smerinthus abyssinicus* Lucas, *Ann. Soc. Ent. Fr.* p. 606. t. 13. f. 2 (♀) (1857) (Khartum;—Mus Paris).

Zonilia abyssinica, Walker, *List Lep. Ins. B. M.* xxxi. p. 34 (1864) (Abyssinia).

Basiana abyssinica, Butler, *Trans. Zool. Soc. Lond.* ix. p. 596. n. 9 (1877) (Abyssinia): Kirby, *Cat. Lep. Het.* i. p. 702. n. 8 (1892) (Abyssinia).

**Smerinthus bianchii* Oberthür, *Ann. Mus. Civ. Genova* xviii. p. 734. n. 84. t. 9. f. 8 (♀) (1883) (Shoa;—coll. Charles Oberthür).

♂. Not known.

♀. This sex differs from that of the preceding subspecies in the lines of the forewing being thinner and better defined, especially those on the disc. The ridge in front of the vaginal orifice is similar to that of *post. postica*, but less incrassate, with the folds rather sparser.

We are inclined to regard *abyssinicus* as a synonym of *post. postica*, but more material from Abyssinia must be examined before the two can be put together. For the present it is certainly more opportune to keep them apart. Possibly the East African individuals of *post. postica* may turn out to be somewhat different in structure from the southern specimens; here, too, more material is wanted.

Hab. Abyssinia: Khartum (1 ♀ in the Paris Museum): Shoa (1 ♀ in coll. Oberthür).

c. P. postica occidentalis subsp. nov.

Clanis postica, Druce, in Moloney, *West Afr. Forestry* p. 493. n. 9 (1887).

♂♀. Distal margin of forewing straight in middle in ♂, feebly convex in ♀. The black band of the hindwing entire in most individuals, especially in the ♀ sex. Sexual organs remarkably different from those of *post. postica* and *abyssinicus*.

♂. The two processes of the tenth tergite closer together than in *post. postica*, longer, and more strongly curved downwards (Pl. XXIV. f. 8, side-view). The clasper is distally divided into a broad ventral lobe, which is pointed, almost hooked at the end (Pl. XXXII. f. 12), and a slender dorsal lobe, which has developed into a strongly chitinised hook curving ventrad, nearly touching with the tip the apex of the ventral lobe; the harpe is larger than in *post. postica*; the distal process

is very broad at base, gradually tapering to end, curving ventrad and basad, and protruding beyond the edge of the ventral margin of the clasper. The sheath of the penis has the lateral teeth less developed, while the mesial ones (the most proximal) are represented by one or two short but rather high carinae, or by cariniform teeth.

♀. The eighth abdominal tergite has, besides the two processes shown in fig. 16 of Pl. XVI. some smaller teeth at the edge; the length of the processes is very variable. Proximal part of vaginal plate (Pl. XVI. f. 15) raised into a dentate ridge, which is deeply sinuate mesially: laterally the ridge joins a dentate process which curves mesiad and ends in a point, this conical process prominent, visible without dissection after removal of a few scales.

Hab. West Africa, from Sierra Leone to the Congo.

In the Tring Museum 6 ♂♂, 3 ♀♀ from: Sierra Leone (*type*, ♂): Bopoto and Yakusu, Upper Congo (K. Smith), one in July.

184. **Pseudoclanis grandidieri.**

**Ambulyx grandidieri* Mabille, *Bull. Soc. Philom.* (7). iii. p. 135. n. 8 (1879); id., *Ann. Soc. Ent. France* p. 297 (1879) (S.E. Mad.); Saalm., *Lep. Madag.* p. 124. n. 296 (1884); Kirby, *Cat. Lep. Het.* i. p. 676. n. 30 (1892).

**Ambulyx watersi* Butler, *Ann. Mag. N. H.* (5). xiv. p. 407 (1884) (Betsileo;—Mus. Brit.); Kirby, *l.c.* n. 31 (1892).

Pseudosmerinthus semnus Karsch, *Ent. Nachr.* xxvi. p. 370. n. 5 (1900) (West Madag.).

♂♀. Though we have only seen the types of *grandidieri* and *watersi*, we do not entertain the slightest doubt that the third name quoted above refers to the same species. Tongue short and weak, scarcely visible between the palpi. Palpus long, slender. Tibiae spinose, hindtibia with few spines at end; spurs with long naked points, those of midtibia almost equal, longer terminal one of hindtibia more than half the length of the first tarsal segment. Forewing falcate: SC^2 and R^1 of hindwing on a rather long stalk; $R^2 = R^3$, R^3 nearly twice the length of R^1.

♂. Tenth tergite triangular, curved, simple, apex obtusely pointed, distally subcarinate above; tenth sternite (Pl. XXIII. f. 18) with two short pointed processes. Clasper covered in distal half, outer side, with small, sharply bidentate scales; harpe (Pl. XXXI. f. 22) dilated ventrally, fish-tail shaped at end, the two processes unequal in type of *watersi*, equal in another specimen dissected: eighth tergite with the marginal scales turned inside, forming a crest or ribbon of scales. Penis-sheath with a slender pointed process directed proximad.

♀. Not dissected.

Early stages not known

Hab. Madagascar; Comoro Is.

In the British Museum, coll. Oberthür, coll. Grandidier and the Museum at Halle.

A single ♂ from Grande Comore in the collection of Charles Oberthür differs in the forewing being less falcate, and in the black band of the hindwing being more proximal and almost separated into vein-spots.

LVII. PLATYSPHINX gen. nov.—Typus : *constrigilis*.

Ambulyx Walker (*non* id., 1856), *Proc. Nat. Hist. Soc. Glasgow* i. p. 328 (1869).
Basiana, Mabille (*non* Walker, 1856), *Bull. Soc. Zool. France* ii. p. 491 (1878).
Brachyglossa ♀, id., *Ann. Soc. Ent. France* p. 293 (1879).

♂ ♀. Tongue rather stout, but short. Palpus smaller in ♀ than in ♂, joint not quite open. A tuft of long hair-scales behind the eye, hanging over the lower part of same. Antenna of ♀ thin, cylindrical, not grooved, seriated ciliae very slightly prolonged : of ♂ strongly compressed, deeply grooved : end-segment short. Abdominal tergites spinose all over, the spination more tawny, stronger, and denser at the apical margins. Tibiae *spinose* ; foretibia nearly as long as tarsus ; spurs short, *one* pair to hindtibia : pulvillus and paronychium present. Distal margin of wings entire ; apex of forewing little produced, acute, hinder angle very obtuse in ♀, less so in ♂ : D^2 of hindwing oblique, about twice as long as D^3, lower angle of cell more or less acute. Clasper and eighth tergite without friction-scales.

Early stages not known : the larva most probably spiny.

Hab. West and East Africa, not yet known from German and British East Africa.

A derivation from a form similar to *Pseudoclanis postica*, differing in the shorter tongue, the longer tibiae, the absence of the proximal pair of hindtibial spurs, the not-prolonged seriated ciliae of the ♀-antenna, etc.

The four species resemble one another rather closely in colour ; their discrimination requires some care.

Key to the species :

a. Hindwing below shaded with conspicuous white scaling on disc	185.	*P. constrigilis*.
Hindwing below without white scaling on disc .		*b*.
b. Forewing practically without speckles . .	188.	*P. pialilis*.
Forewing with numerous speckles . . .		*c*.
c. Forewing below with large red patches or a red band behind cell	186.	*P. stigmatica*.
Forewing below without either large red patches or a red band behind cell .	187.	*P. phyllis*.

185. Platysphinx constrigilis.

Ambulyx constrigilis Walker, *Proc. Nat. Hist. Soc. Glasgow* i. p. 328. n. 2 (1869) (Congo) ; Kirby, *Cat. Lep. Het.* i. p. 676. n. 29 (1892).
Ambulyx? constrigilis, Butler, *Trans. Zool. Soc. Lond.* ix. p. 582. n. 12 (1897).

♂ ♀. This is the most generalised of the species of this genus.

Wings : *upperside*, speckles small, those of forewing minute.——Forewing : a straight, narrow, oblique line 2 or 3 mm. proximally of M^2, continuous from costal to inner margin, another line across apex of cell appearing as a direct prolongation of a line along R^3, an isolated luniform line between M and (SM^1) proximally of base of M^1 ; three discal lines, the inner two geminate, both obsolete between R^2 and M^1, reappearing between M^1 and M^2 as two halfmoons, of which the proximal one is very faint ; the third line consisting of arches, produced distad upon the veins, arch R^3—M^1 much more proximal than the others ; a short brown

apical line; besides the white subapical halfmoon, there is a diffuse whitish patch at the costal margin between the cell and the first discal line, and another smaller one beyond the second discal line.——Hindwing: a discal line touching apex of cell, narrow, sometimes indistinct in front, another near it, abbreviated or obsolete, a third convex in front, then concave, narrow, and a black line outside the third at anal angle reaching up to M^2; veins with minute black streaks at extremities.

Underside.——Forewing: markings similar to upperside, less distinct, those in basal half red, the subbasal line vestigial, straight streak in apex of cell as on upperside in the direction of R^3, subapical white spot larger and more strongly projecting distad before SC^5, the other two white patches restricted to the costal margin.——Hindwing: lines nearly as above, but blackish brown, interspace between second and third, or nearly the whole wing, shaded with white, a short white line before apex, marginal area very faintly shaded with white.

♂. Tenth tergite broad, sides undulate (Pl. XXIV. f. 9; apex broken in the only specimen at disposal; it is apparently cleft or sinuate); sternite produced into a long, slender, cylindrical, slightly club-shaped process. Clasper (Pl. XXXIII. f. 1) narrowed towards apex, ventral margin dilated near base, then emarginate: harpe represented by a proximal, pointed, slightly curved process which stands far apart from the clasper, the processes of the two sides being close together and visible between the claspers without dissection. Penis-sheath (Pl. XXX. f. 23) stout, jug-shaped, the apical margin produced laterad; penis-funnel (p-f) with a short, ventral, carinate process.

♀. Vaginal plate (Pl. XVII. f. 3) resembling to a certain extent that of *Pseudoclanis postica*; antevaginal part (*avp*) mesially folded, a large groove at each side; vaginal orifice (*V*) situated between two compressed processes, which are curved mesiad and are pointed, resembling somewhat a bird's head and breast; post-vaginal part (*pvp*) slightly sunken proximally, the greater part membranaceous, scaled.

Early stages not known.

Hab. West Africa: Sierra Leone to the Congo.

In the Tring Museum 1 ♀ from Sierra Leone, and a very bad ♂ from the Niger Coast Protectorate.

A fine ♂ from Cameroons in the Museum at Stockholm.

We have not seen the *type* of *constrigilis*, but Walker's description agrees very well with this insect, which can easily be distinguished from the other species by the forewing having three white costal patches, a narrow and straight subbasal line, and a narrow line at the apex of the cell, which line has the direction of R^3.

186. Platysphinx stigmatica.

**Basiana stigmatica* Mabille, *Bull. Soc. Zool. France* ii. p. 491 (1878) (Congo;—coll. Mabille); Kirby, *Cat. Lep. Het.* i. p. 703. n. 9 (1892).

Brachyglossa? stigmatica Mabille, *Ann. Soc. Ent. France* p. 293. note t. 6. f. 1 (♀) (1879).

**Basiana conspersa* Dewitz, *Mitth. Münch. Ent. Ver.* iii. p. 29. t. 1. f. 2 (♂). 2a (♀) (1879) (Chinchoxo;—Mus. Berlin).

♂♀. *Upperside.*——Forewing: an oblique costal patch reaching M at or near base of M^2, followed behind M by a smaller one which is somewhat more proximal than the hinder end of the first patch, and more or less continuous with a third spot behind (SM^1), the three forming a quite irregular line or band; another irregular band before apex of cell, consisting of two patches, the first oblique from costa to

M, several mm broad, the second between M^1 and SM^2, the two separated or contiguous ; two equally indistinct and ill-defined bands or traces of such on disc, the external one more or less dentate, widened at costal margin, here including a white lunule (which stands really at the proximal side of the dentate line proper) ; the marginal area partly or almost totally filled up with brown scaling, especially between R^2 and M^2, this brown area absorbing more or less the dentate line.——Hindwing : the tawny red speckles large, becoming blackish brown at the abdominal margin, the two bands formed by the speckles broad, the external one not always distinct.

Underside : speckles of both wings large.——Forewing : bands as above, but those in the basal half red ; subapical white patch larger than above, more square ; fringe black at ends of veins.——Hindwing : discal band not touching lower angle of cell, about 2 mm. broad ; the others nearly parallel to margin, not concave beyond middle ; costal margin more than twice as long as abdominal margin.

♂. Abdomen open behind owing to the peculiar development of the claspers. Tenth tergite (Pl. XL. f. 11, ventral view) broad, sinuate, lobes rounded ; sternite broad, strongly narrowed to apex, which is truncate, middle of sternite sunken. Clasper (Pl. XL. f. 8) : dorsal margin produced distally into a long process which is armed with thin acute teeth ; ventral part of clasper reduced, rounded, densely clothed with small scales ; a subbasal rather slight fold, and another fold situated more distally beset with bristles ; harpe represented by a long pointed process ; the processes of the two harpes close together. Penis-sheath (Pl. XL. f. 14) short, stout, curved, ending in a short process which appears clubbed in side-view, but is compressed and therefore pointed in dorsal view.

♀. Vaginal plate (Pl. XVII. f. 2) larger than in the other species ; vaginal orifice (I) on a kind of postament which is compressed to a ridge at each side, the ridge truncate with the angles projecting : behind this elevated structure there is a deep cavity the hinder (or upper) wall of which is formed by the large, strongly chitinised, postvaginal plate (*prp*), this plate mesially carinate within the cavity, and transversely rugate or folded distally.

Hab. Congo basin and East Africa : its range extends probably farther north.

In the Tring Museum 2 ♂♂, 3 ♀♀ from the Congo : Bopoto, August and December (Oram ; K. Smith) ; and Portuguese East Africa.

187. **Platysphinx phyllis** spec. nov. (Pl. I. f. 1, ♀).

♀. Wings comparatively shorter and broader than in the other species ; body and wings paler.

Wings, *upperside*, speckles sparser, on hindwing in size midway between those of *constrigilis* and *stigmatica*.——Forewing : hinder angle less rounded ; subbasal line indicated by an oblique indistinct line in cell in front of base of M^2 ; a line in apex of cell, broader than in *constrigilis*, much narrower than the respective patch in *stigmatica*, forming as in the latter species an obtuse angle with R^3, a short elongate costal mark at base of fork indicating a discal line, another narrower mark halfway to apex, a brown apical patch, sharply defined behind, within it a trace of the white spot of the other species ; speckles somewhat denser in marginal area between R^3 and M^2 and along R^3.——Hindwing : abdominal margin paler than in the other species, with few speckles ; the inner discal band vestigial, nearly straight, the second and third present in *constrigilis* not marked.

Underside more extended pale yellow, especially the forewing, than in the other species, the speckles not denser than above.——Forewing : the brown apical patch sharply defined behind, including white scaling, costal markings as above, some larger speckles on disc indicating the exterior discal line.——Hindwing : inner discal line more distinct than above, composed of speckles, not touching cell, the external discal line indicated by a small costal spot.

Vaginal plate (Pl. XVII. f. 1) proximally convex ; orifice (*F*) very large, its edge produced into a short tooth at the sides (*a*); at the hinder margin stands at each side a long finger-like process which is basally broader in a lateral than in a ventral view, the apex of the process is obtuse ; postvaginal part of plate (*pvp*) very short, membranaceous, scaled, no cavity behind the processes.

Length of forewing : 52 mm.

♂ and early stages not known.

Hab. Konakry I., Los Islands, W. Africa; 1 ♀ in the Tring Museum, received from a correspondent in Berlin.

188. Platysphinx piabilis.

Ambulyx piabilis Distant, *Ann. Mag. N. H.* (6). xix. p. 580 (1897) (Transvaal ;—coll. Distant) ; id., *Ins. Transv.* t. 4. f. 2 (1902).

♂. Wings, *upperside*.—— Forewing scarcely with any speckles, five costal spots, sharply marked, the first narrower, in front of base of M^2, the second broader, oblique like the first, before end of cell, the third at fork, at right angles to R^1, the fourth small, 10 mm. from apex, the fifth subapical, narrowly crescent-shaped, with some brown speckles near it, the spot and speckles situated in a very faint, deeper yellow triangle ; fringe yellow like disc, with minute black vein-dots.——Hindwing : red speckles dispersed, none in apical half of cell, and only traces of a few in the pale abdominal area, fringe pale yellow, blackish at anal angle, with a small spot at vein M^2.

Underside purer yellow than in the other species ; forewing brighter yellow in basal two-thirds, with vestiges of minute speckles, a red bar in middle and a larger red spot at apex of cell, traces of red spots behind M^2, a short brown bar at fork, a lunate subapical spot shaded with a few white scales, preceded by a minute spot as above.——Hindwing : speckles less numerous than in the other species, and less distinct.

Antenna longer and stouter than in *constrigilis*, hindwing narrower. Tenth tergite (Pl. XXIV. f. 10) broad and short, sinuate, the lobes convex above, rounded ; sternite produced into a long triangular process, which is much broader basally than in *constrigilis*. Harpe entirely different from that of *constrigilis*, consisting of a broad obtuse process armed with many acute teeth (Pl. XXXIII. f. 2). Penis-sheath ending in a long pointed process (Pl. XXX. f. 22).

♀ and early stages not known.

Hab. Pretoria, Transvaal.

One ♂ in coll. W. L. Distant.

LVIII. LEPTOCLANIS gen. nov.—Typus: *pulchra*.

Smerinthus, Walker (*non* Latreille, 1802), *List Lep. Ins. B. M.* xxxv. p. 1858 (1866).
Charocampa, Westwood (*non* Duponchel, 1835), in Oates, *Matabeleland* p. 354 (1881).
Theretra, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 651 (1892).

♂. Tongue short and weak, clothed with long woolly scales. Pilifer with bristles, close to genal process, which is globose. Palpus smoothly scaled, slender, first segment short, second about three times as long as broad, joint not distinctly open. Head crested. Antennal segments dilated above the grooves, outline of antenna therefore crenate in dorsal view, distal segments scarcely compressed, higher than long, oblong in side-view, with the ventro-basal angle rounded, end-segment very obtuse, about half as long again as basally high. A tuft of long hair-scales behind eye, and a small tuft at frontal side of eye. Abdomen with spines only at the edges of the tergites. Tibiae *spinose*, spines prominent, few in number, those at end of foretibia slightly prolonged; spurs short, two pairs to hindtibia, longer terminal spur about one-fourth the length of the first tarsal segment; claws slender, pulvillus present, paronychium *absent*. Distal margin of wings entire, apex of both wings pointed but not produced; D^2 of hindwing in or below centre, cross-veins nearly or quite straight, slightly oblique, lower angle of cell not very acute. No organ of friction on clasper and eighth tergite.

♀ and early stages not known.

Hab. S.E. and S.W. Africa.

Two species.

Differs from *Polyptychus*, *Clanis*, and *Leucophlebia* in the absence of the paronychium.

The genus is of particular interest, as it connects the aberrant-looking *Leucophlebia* with *Clanis*.

189. **Leptoclanis pulchra** spec. nov. (Pl. LXVI. f. 9, ♂).

♂. Body creamy; face, middle of crest, centre of collar, a mesial stripe on mesonotum, a broad inner border to mesothoracical tegula, middle of metanotum and first abdominal segment, palpus, breast and anterior femur and tibia olive-green; spinules of abdominal tergites ochraceous; first segment of palpus with lateral tuft of red scales.

Wings with the veins more or less creamy in distal area. *Upperside.*——Forewing: cream-colour; a rather large subbasal dash at inner margin, a triangular patch filling up apex of cell, a triangular subapical costal patch between SC^1 and R^1, and two patches at bases of cellules R^3—M^1, olive-green, the latter two patches shading off distally, the green scaling reaching margin, where it extends to costal and inner angles; three indistinct lines: one before base of M^2, oblique, two on disc, parallel, 3 mm. distant from each other.——Hindwing: basal two-thirds red rest creamy, shaded with olive-green, especially at distal margin; two thin discal lines.

Underside.——Forewing red from base to end of cell or beyond, rest dirty cream-colour, shaded with olive-green; two discal lines as above, and a trace of an oblique apical line.——Hindwing: a red subbasal streak behind (SM^1), two discal lines as above, the proximal one 2 to 3 mm. from cell at R^3, curved behind and slightly also in front: an elongate buffish stigma.

♂. Tenth tergite broad (Pl. XXIV. f. 4), apex turned downward, subtruncate; sternite (*Xv*) also broad, long, deeply and broadly sinuate, the two lobes long, obtuse. Clasper obtusely triangular (Pl. XXXII. f. 17), with a dorso-basal compressed process (*pdb*) which is tuberculose apically at the edge; harpe a subventral longitudinal ridge which is basally and apically produced into a process, the harpe resembling that of *Clanis undulosa* (Pl. XXXII. f. 8). Penis-sheath without armature.

♀. Not known.

Hab. Salisbury, Mashonaland, December and February (G. A. K. Marshall); Angola.

In the Tring Museum 3 ♂♂ from Salisbury (*type*); and Golungo Alto, Angola (Welwitsch). A series from Salisbury in the British Museum.

190. **Leptoclanis basalis.**

Smerinthus basalis Walker, *List Lep. Ins. B. M.* xxxv. p. 1858 (1866) (Zambesi;—coll. Waller, ubi?).
Polyptychus? basalis, Butler, *Trans. Zool. Soc. Lond.* ix. p. 584. n. 6 (1877) ("*basilis*" in Index).
**Chaerocampa virgo* Westwood, in Oates, *Matabeleland* p. 354. t. r. f. 11 (♂) (1881) (Zambesi;—Mus. Oxford).
Theretra virgo, Kirby, *Cat. Lep. Het.* i. p. 651. n. 11 (1892).
Basiana (?) *basalis*, id., *l.c.* p. 703. n. 12 (1892).

♂♀. We have not the type of *basalis*; the description applies, however, without doubt to the insect figured by Westwood as *virgo*. The ♂ is very pale, the green patches of the preceding species are absent, the forewing has a distinct black stigma, and the red patch of the hindwing is much more sharply defined than in *pulchra*. The ♀ is said by Walker to have the forewing speckled with brown and traversed by five brown lines (another species?).

♂. Tenth tergite divided into two widely separated slender and acutely pointed processes which are curved mesiad and ventrad; the sternite with one long, very slender and very sharp process. Harpe (Pl. LIX. f. 7) ending in a short, broad, rounded, dentate ridge.

Hab. Zambesi.

One ♂ in the Oxford Museum.

LIX. LEUCOPHLEBIA.—Typus: *lineata*.

Leucophlebia Westwood, *Cab. Or. Ent.* p. 46 (1848) (type: *lineata*).
Rasphele Boisduval, *Spec. Gén. Lép. Hét.* i. p. 55 (1875) (type: *lineata*).

♂♀. Tongue short and weak, naked or scaled. Pilifer with bristles. Antenna strongly compressed in ♂ (inclusive of distal segments), deeply grooved, dilated above the grooves, outline crenate in dorsal view, penultimate segment about as long as high, last one triangular, about three times as long as basally high, or the antenna pectinated; in ♀ slightly prismatical, scarcely grooved, without distinctly prolonged seriated ciliae, broader than high in transsection, distal segments somewhat flattened ventrally. No eyelashes. Palpus much larger in ♂ than in ♀; joint not open. Abdominal tergites spinose at least at the edges. Tibiae *spinose*; two pairs of spurs to hindtibia, longer terminal spur about one-third the length of the first tarsal segment; pulvillus and paronychium *present*, but the lobes of the latter short and slender, the ventral lobes longer than the lateral ones, which are almost obsolete. Distal margin of wings entire, apex of forewing pointed, but not

produced, hinder angle completely rounded ; D^2 of hindwing in or near centre, seldom far below centre. Clasper without friction-scales ; penis-sheath without armature.

Larva insufficiently known : green, granulose, two longitudinal white side-stripes, the lower not very distinct ; head (triangular?) with pink side-stripe ; horn short, pink.—Food-plant : *Saccharum* !

Hab. Indo-Malayan and Aethiopian Regions.

Four species.

Very near *Leptoclanis* in structure, but distinguished from that genus as well as *Polyptychus* and *Clanis* by the paronychium being short-lobed and the hinder angle of the forewing being rounded. The sexual armature is of the same type as in *Clanis* and *Leptoclanis* : the buff vein-streaks recall the creamy veins of *Leptoclanis*.

The four species form an interesting series as regards the development of the maize-yellow area of the forewing. This streak is, in *lineata*, confined in basal half to the cell, being limited behind by M ; in *emittens* it lies within the cell and behind it ; while in the two African species it lies behind the cell, being limited in front by vein M.

In the colour of the thorax and head *emittens* (India) agrees with *neumanni* (Africa), and *lineata* (India) with *afra* (Africa).

Key to the species :

a.	Abdominal tergites black, except spines . .	193. *L. afra*.
	Abdominal tergites not black, frons and occiput the same red colour	*b*.
	Abdominal tergites not black, frons dark, occiput pale	191. *L. lineata*.
b.	Maize-yellow streak of forewing limited in front by vein M, a yellow stigma . .	194. *L. neumanni*.
	Maize-yellow streak of forewing entering cell, no stigma	192. *L. emittens*.

191. Leucophlebia lineata.

**Leucophlebia lineata* Westwood, *Cab. Or. Ent.* p. 46. t. 22. f. 2 (♀) (1848) (Centr. Ind., Assam, etc.;—Mus. Oxford) ; Walk., *List Lep. Ins. B. M.* ix. p. 136. n. 1 (1856) (Nepaul) ; Moore, in Horsf. & Moore, *Lep. Ins. Mus. E. I. C.* i. p. 265. n. 610. t. 8. f. 5 (*l.*) (1857) (Java) ; id., *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 594. n. 1 (1877) (Nepal : Java) ; Snell., *Tijdschr. Ent.* xxii. p. 64. n. 4 (1879) (S. Celebes : syn. partim) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 28. n. 153 (1887) ; Leech, *Trans. Ent. Soc. Lond.* p. 120. n. 103 (1889) (Kiukiang) ; Pag., *Jahrb. Nass. Ver. Nat.* xliii. p. 101. n. 181 (1890) (E. Java) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 28. n. 113 (1892) (Flores : Assam) ; Kirby, *Cat. Lep. Het.* i. p. 709. n. 1 (1892) (N. India ; Java) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 74. n. 100 (1892) (Chekiang ; Nepal : Cachar ; S. India : Ceylon : Java ; = *rosacea*) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 368. n. 44 (1895) (Java) ; Leech, *Trans. Ent. Soc. Lond.* p. 279. n. 42 (1898) (Kiukiang).

Leucophlebia luxeri Boisduval, *Spec. Gén. Lép. Het.* i. p. 55. n. 1 (1875) (Java : Centr. Ind. : nom. nov. loco *lineata*).

Rasphele luxeri id., *l.c.* (1875) (sub syn.).

**Leucophlebia rosacea* Butler, *Proc. Zool. Soc. Lond.* p. 15. t. 2. f. 1 (♂) (1875) (Coimbatoor ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 595. n. 2 (1879) ; Moore, *Lep. Ceyl.* ii. p. 10. t. 80. f. 3 (1882) ; Kirby, *Cat. Lep. Het.* i. p. 704. n. 2 (1892).

♂ ♀. Some specimens are more rosy than others ; fresh-bred individuals are especially bright. We do not notice any local difference between the examples

from the various countries. The maize-yellow streak of the forewing is not constant in width. Distal edge of hindwing seldom rosy.

♂. Tenth tergite gradually narrowed to the end, longitudinally impressed, the strongly chitinised lateral edges somewhat elevated, apex truncate ; sternite with a broad, rounded, mesial lobe. Clasper sole-shaped, apex evenly rounded, harpe without distinct processes and ridges ; basi-dorsal tuberculated process of clasper short, corresponding to the process *pdb* of Pl. XXXII. f. 10. 11.

♀. Eighth tergite rounded-truncate, the angles rounded. Vaginal plate not strongly chitinised, not sealed, posterior part truncate, with the sides oblique ; edges of orifice somewhat raised ; no processes (Pl. XVII. f. 6).

Larva see above.

Hab. Formosa, China, N.W. India to Ceylon, eastwards to the Philippines, Celebes and Flores ; not yet found on Borneo.

In the Tring Museum 29 ♂♂, 6 ♀♀ from : Ceylon : Travancore ; Nilgiris ; Kulu ; Assam ; N.W. Fokien, China ; Wei-hai-wei, October (Dr. Lambert) : Formosa ; Java ; Luzon (Dr. Meyer) : S. Celebes (Ribbe : Fruhstorfer).

192. Leucophlebia emittens.

**Leucophlebia emittens* Walker, *List Lep. Ins. B. M.* xxxv. p. 1858 (1866) (Hindostan ;—Mus. Brit.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 56. n. 2 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 595. n. 4 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 28. n. 156 (1887) ; Kirby, *Cat. Lep. Het.* i. p. 704. n. 4 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind*, *Moths* i. p. 75. n. 101 (1892) (N.W. Him ; Sikhim ; Bombay ; Centr. Ind. ; Burma ;=*bicolor*=*damascena*) : Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 28. n. 114 (1892) (Bombay) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 407. n. 101 (1898) (not seen ; Elwes : distinct from *lineata*).

**Leucophlebia bicolor* Butler, *Proc. Zool. Soc. Lond.* p. 16. t. 2. f. 5 (1875) (Almorah ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 595. n. 3 (1877) ; Moore, in *Sec. Yark. Miss.* p. 7. n. 25 (1879) ; Butl., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 11. t. 80. f. 6 (1881) ; Swinh., *Proc. Zool. Soc. Lond.* p. 435. n. 12 (1886) (Mhow, vi. vii.) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 28. n. 155 (1887) (Yarkand ; Simla ; Sattara ; Mhow) ; Kirby, *l.c.* p. 704. n. 3 (1892).

**Leucophlebia damascena* Butler, *Proc. Zool. Soc. Lond.* p. 392 (1875) (Sikhim ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 639 (1877) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 11. t. 80. f. 7 (1881) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 28. n. 157 (1887) ; Kirby, *l.c.* p. 704. n. 5 (1892).

♂♀. Hampson was quite right in suggesting that the type of *emittens* is a discoloured specimen.—Pronotum and occiput of the same (red) colour as the frons ; hindwing with the distal margin narrowly pink. The maize-yellow colour of the streak of the forewing extends along veins R^3, M^1, M^2 as a rule, sometimes the streak M^2 vestigial only. Abdominal tergites spinose all over.

♂. Tenth tergite more abruptly narrowed than in *lineata*, apex somewhat sinuate ; lobe of sternite broad, shallowly sinuate at the sides and apex, the strongly rounded apical angles being a little produced distad and laterad, the segment reminding one of that of *Clanis curoa*. Clasper and harpe essentially as in *lineata*.

♀. Only one specimen dissected, the dissections unfortunately destroyed by an accident.

Larva not known.

Hab. N.W. Himalayas to Burma, southward to Bombay.

In the Tring Museum 12 ♂♂, 2 ♀♀ from : Ajmere, July ; Sabathu, Simla ; Solon, July ; Dalhousie ; Allahabad, N.W. Ind. ; Sattara ; Mhow.

193. Leucophlebia afra.

**Leucophlebia afra* Karsch, *Ent. Nachr.* xvii. p. 12. t. 1, f. 1 (♂) (1891) (Mukenge; Kassai; Mus. Berlin); Kirby, *Cat. Lep. Het.* i. p. 704. n. 6 (1892).

♂♀. Tongue with long red scales, especially at the base. The spinules of the abdominal tergites are confined to the edges; they are ochraceous, forming bands; eighth tergite not black. The occiput is pale cream-colour, while the frons and palpi are bright rose-colour like the underside of the body. Whereas in *lineata* and *emittens* the mid- and hindtibia have an almost white stripe on the upperside, they are either all rosy red in *afra* or have a vestigial yellow stripe. The pectinations of the ♂-antenna are long, scaled on the upper surface; the ventral outline of the proximal segments is concave in side-view. Forewing with a rounded maize-yellow stigma. R^2 of hindwing curved, sometimes twice the length of R^3.

♂. Tenth tergite (Pl. XXIV. f. 5) sinuate at end, slightly rounded at the sides; sternite deeply sinuate, the sinus rounded, the lobes triangular, rounded at the end. Clasper (Pl. XXXII. f. 18) broad, with a long dorso-basal process (*pd*); harpe ending distally in two points.

Early stages not known.

Hab. Tropical West and East Africa.

In the Tring Museum 5 ♂♂ from: Old Calabar; Upper Congo; Mubande (Buekulla), Uganda, 31. iii. '99 (Dr. Ansorge); Mpapua, German East Africa (Dr. Baxter).

194. Leucophlebia neumanni.

**Leucophlebia neumanni* Rothschild, Nov. Zool. ix. p. 598. n. 11 (1902) (Mus. Tring).

♀. Differs from *afra* in the following points: larger, body entirely rosy red, meso-metanotum with a maize-yellow middle stripe, abdominal tergites also with a few yellow scales, mid- and hindtibia creamy white above as in the Indian species.

Wings, *above*.——Forewing: the mesial streak deeper yellow, less broad in middle, more strongly dentate at R^3, M^1 and M^2, costal edge very narrowly yellow, stigma present, but smaller than in *afra*.——Hindwing more elongate.

Underside: costal and distal margins of both wings red; cross-veins of hindwing straight, R^2 central, lower angle of cell less acute than in *afra*.

Abdominal tergites dorsally spinose all over, as in the Indian species. Eighth tergite deeply incised mesially, the lobes rounded. Anterior and lateral edge of vaginal orifice raised into a rather high ridge, which is slightly sinuate mesially.

Length of forewing: ♀, 23 to 24 mm.

Hab. Gelo R. to Akobo R., Aethiopia, May 1901 (O. Neumann), 2 ♀♀.

LX. POLYPTYCHUS.—Typus: *dentatus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* ii. Index (1777); Stoll., in Cram., *l.c. Suppl.* (1790); *Fabr.*, *Ent. Syst.* iii. 1. p. 356 (1793).
Polyptychus Hübner, *Verz. bek. Schmett.* p. 141 (1822) (partim; type: *dentatus*).
Andriasa Walker, *Cat. Let. Hep. B. M.* vii. p. 1735 (1856) (type: *contraria*).
Smerinthus, id. (*non* Latreille, 1802), *List Lep. Ins. B. M.* viii. p. 252 (1856).
Panacra id., *l.c.* viii. p. 154 (1856) (partim; type: *automedon*).
Zonilia id. (*non* id., 1856), *l.c.* xxxi. p. 34 (1864).
Basiana, id. (*non* id., 1856), *l.c.* xxxi. p. 37 (1864).

Gynocryx Guenée, in Vins., *Voy. Madag.* p. 30 (1865) (*nom. nud.*).
Ambulyx Walker (*non* id., 1856), *Proc. N. H. Soc. Glasgow* i. p. 328 (1869).
Temnora, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 289 (1875).
Pseudosmerinthus Butler, *Trans. Zool. Soc. Lond.* ix. p. 593 (1877) (type : *contraria* = *submarginalis*).
Triptogon id. (*non* id., 1877), *Cist. Ent.* ii. p. 393 (1879).
Devitzia Holland, *Trans. Amer. Ent. Soc.* xvi. p. 65 (1889) (includes *contraria*).
Dewitzia (!) id. *Ent. News* iv. p. 341 (1893).
Maramba, Kirby (*non* Moore, 1882), *Cat. Lep. Het.* i. p. 708 (1892).

♂ ♀. Joint of first and second palpal segments more or less open. Tibiae all spinose ; two pairs of spurs to hindtibia : pulvillus, paronychium, frenulum and retinaculum present.

Closely allied to *Clanis*, distinguishable by the open joint of the palpus, or a very weak tongue, or a scalloped distal margin of the wing, or the absence of spinules from the abdominal tergites (excepting edges).

The thirty-two species here treated as *Polyptychus* represent without doubt several genera. The characters given for the genera already proposed are, however, not reliable. We have tried to separate generically the motley of forms according to their structure, but found that it would be necessary to erect a genus for every two or three species, which, we think, is quite inopportune at present. The division of *Polyptychus* into smaller genera must be left till the African Sphingid fauna is better explored ; for we believe that the number of undescribed species coming into this group of forms is very large. When a larger proportion of the existing species is known, one will be better able to judge, how far one should go in dividing up the present genus *Polyptychus*. Of the names proposed, *Polyptychus* will eventually stand for the Indian forms (*dentatus*, *trilineatus*) ; *Andriasa* and *Pseudosmerinthus* are both based upon *contraria*, the former on the ♂, the other on the ♀ ; *Devitzia* was proposed for *contraria* and *paupercula*, and will therefore always remain a synonym of *Andriasa*. As yet only three names are available for the genera into which *Polyptychus* will ultimately be separated ; at least five more will be needed—a fine opportunity of acquiring immortality, provided the scientists of the distant future do not shake off our system of nomenclature by inventing one of their own.

The tongue varies in the different species from being strong and reaching to the abdomen (*orthographus*, etc.) to being nearly altogether obliterated (*grayi*). The joint of the palpus is not distinctly open in *trisecta* and *orthographus* ; the size of the palpus is variable according to species or groups of species. The abdominal tergites are spinose all over in some species, in others the spines are restricted to the edges. The spurs are very long in *trisecta* and allies, short in other species ; in some they are spinose, in others they are not. The clasper has a patch of friction-scales, or has not. The distal margin of the forewing is entire, straight, convex, dentate, or scalloped ; the apex produced, or not. R^2 of the hindwing varies in position, and the cross-veins D^2 and D^3 are sometimes very oblique, sometimes not. The antennae are also not the same in structure in all the species.

The structural differences are mentioned below under the various species. We hope that, by pointing out these differences, we are not inducing anybody who has no knowledge of the insects themselves to seize upon these characters and be busy proposing generic names for the species.

The larva is known only of one of the two Indian and of one African species : it has the triangular head and granulose skin after the type of *Sphinx ocellata*.

Possibly some of the African forms may have rounded heads and be covered with spines like *Rhadinopasa*.

Key to the species :

a. Hindwing chrome-yellow in basal half, two large black spots before anal angle	226.	*P. meander.*
Hindwing not so		*b.*
b. Hindwing more or less red or pink		*c.*
Hindwing grey, oehraceous, or brown		*j.*
c. A large species, forewing 50 mm. long, strongly scalloped	203.	*P. goodi.*
Medium-sized species		*d.*
d. Distal margin of forewing evenly convex, apex not produced : no subbasal spot on forewing, no anal spot on hindwing	225.	*P. mutata.*
Apex more or less produced : stigma of forewing a rather large ring ; anal spot of hindwing a short conspicuous band or line		*e.*
As before, but stigma a mere dot, or absent; anal spot small		*f.*
e. Forewing with two minute subbasal dots, first discal line slightly S-shaped	217.	*P. fulgurans.*
Forewing with one heavy subbasal dot, first discal line slightly concave	219.	*P. rosea.*
Forewing with two minute subbasal dots, first discal line slightly concave	218.	*P. numosae.*
f. Forewing with two subbasal dots, first discal line straight	210.	*P. andosa.*
Forewing with one or no subbasal dot		*g.*
g. Forewing with no subbasal dot, first discal line straight		*h.*
Forewing with one subbasal dot, first discal line curved costad		*i.*
h. Hindwing orange-rufous, veins streaked brown distally	213.	*P. coryndoni.*
Hindwing pinkish buff, veins not streaked	214.	*P. marshalli.*
i. D^3 of hindwing shorter than D^1	212.	*P. compar.*
D^3 of hindwing longer than D^1	211.	*P. consimilis*
j. Distal margin of wings even ; if scalloped, forewing with subbasal dot or patch		*k.*
Distal margin of wings more or less scalloped or uneven, no subbasal dot on forewing		*x.*
k. Forewing above with a sharply defined black marginal area from apex to M^2, evenly convex proximally		*x.*
Forewing above without a sharply defined black marginal area		*l.*

l. Forewing above with three sharply marked lines, antemedian, discal, and postdiscal, the other lines faint	*r.*	
Forewing above without such sharply marked lines	*m.*	
m. Forewing above with first discal line S-shaped, beginning at apical fifth of costal margin and ending at basal third of hinder margin	*n.*	
Forewing above with the discal lines more or less parallel to distal margin	*o.*	
n. First discal line very heavy, distal margin entire	208.	*P. rhadamistus.*
First discal line thin, distal margin dentate	209.	*P. boisduvali.*
o. Forewing with a double subbasal dot	*p.*	
Forewing with a single dot, or without	*q.*	
p. Dots large, hindwing with two sharply marked postdiscal zigzag lines, apex of forewing strongly produced	207.	*P. falcatus.*
Dots minute, lines of hindwing indistinct, fringe spotted white	216.	*P. fumosus.*
Dots minute, lines of hindwing indistinct, fringe unicolorous	215.	*P. subjectus.*
q. Forewing with a grey-olive patch near base, near apex, and near hinder angle	206.	*P. enodia.*
Forewing without these patches	*r.*	
r. Occiput and thorax with a dark mesial line, a black subbasal dot on forewing	205.	*P. affinis.*
Occiput and thorax without a dark mesial line; no black subbasal dot on forewing, last stigma of abdomen in a white spot	204.	*P. pygarga.*
Occiput and thorax without a dark mesial line; abdomen without white stigmatal spot	*s.*	
s. Lower angle of cell of hindwing almost 90°, distal margin of forewing convex	220.	*P. foliaceus.*
Not so	*t.*	
t. Hindwing with a blackish brown patch before middle of abdominal margin	222.	*P. nigriplaga.*
Hindwing without blackish brown patch: forewing greenish	199.	*P. viresens.*
Hindwing without blackish brown patch: forewing not greenish	*u.*	
u. Subbasal spot of forewing minute or absent; postdiscal dot M² not larger than the others	221.	*P. contraria.*
Subbasal spot of forewing large: postdiscal dot M² not larger than the others	224.	*P. hollandi.*

	Subbasal spot of forewing large; postdiscal dot M^2 is larger than the others . .	223. *P. pauperula.*
v.	Subbasal spot of forewing large; hindwing with blackish brown anal double spot .	202. *P. carteri.*
	Subbasal spot of forewing small or absent; hindwing without blackish brown anal double spot.	*w.*
w.	Thorax with brown mesial line; hindwing below with one postdiscal line . .	200. *P. trisecta.*
	Thorax without brown mesial line; hindwing below with two postdiscal lines .	201. *P. orthographus.*
x.	Forewing with a subbasal (double) dot or short line; a sharply defined black apical area	*y.*
	Forewing without subbasal dot or short line: no sharply defined black apical area	*z.*
y.	First and second antemedian lines of forewing converging costad . . .	198. *P. digitatus.*
	First and second antemedian lines of forewing not converging costad . .	197. *P. grayi.*
z.	Postdiscal line of forewing straight . .	196. *P. dentatus.*
	Postdiscal line of forewing curved between R^2 and M^1	195. *P. trilineatus.*

195. **Polyptychus trilineatus.**

Smerinthus dentatus, Walker (*non* Cramer, 1777), *l.c.* viii. p. 252. n. 1 (1856).
Polyptychus timesius, Butler (*non* Stoll, 1790), *Trans. Zool. Soc. Lond.* ix. p. 584. n. 2 (1877) (partim).
Polyptychus modestus, Maassen (*non* Fabricius, 1793), *Stett. Ent. Zeit.* xli. p. 60 (1880).
**Polyptychus trilineatus* Moore, *Proc. Zool. Soc. Lond.* p. 390 (1888) (Dharmsala;—Mus. Brit.).

♂ ♀. This species is easily distinguished in all its various local forms from *dentatus* by the postdiscal line of the forewing not being straight, but curving distad behind R^2. There can be no question of mistaking it for *dentatus* after the differences have once been grasped. Maassen is, to our knowledge, the only author who has described the colour differences, but he wrongly identified the species as *modestus* (recte *modesta*). One finds the insect generally named *timesius* in collections; this is a curious misapplication, the figure of *timesius* representing without the slightest doubt the insect previously figured as *dentatus*. The dentate line between the second and third lines of the forewing is mostly not distinct, often barely traceable, sometimes quite absent.

In both *dentatus* and *trilineatus* the tongue is very thin and short, not reaching the end of the fore-coxa, yellowish buff, not visible between the palpi if rolled in. Joint between palpal segments 1 and 2 not open; palpus smaller in ♀ than in ♂. Antennae grooved in both sexes. Spurs not spinose. Distal margin of forewing more or less scalloped or uneven, no black dot at base; cross-veins of hindwing very oblique, lower angle of cell acute. Abdominal tergites with weak spines all over, the spines dense and stronger at the apical margins. Penis-sheath without armature, clasper and eighth tergite without friction-scales.

♂. Tenth tergite narrowed to an acute hook (Pl. XXV. f. 2); sternite

represented by a low ridge: between the sternite and the penis-sheath there is at each side a strongly chitinised, needle-like process (Pl. XXV. f. 2, *n*). The clasper is divided apically by a longitudinal slit (Pl. XXV. f. 2); the ventral processes of the clasper are fused together, completely or partially, to form a single ventral process (Pl. XXV. f. 2, *pr*), while the submesial processes (*pdr* and *pdl*) are quite unequal. The details of the armature are very different in the specimens from different countries, and there is also some individual variability.

♀. The eighth tergite is mesially sinuate; on the upper surface of the lobes there is a projecting cone or lobe (Pl. XVIII. f. 5. 8), or there is no further armature. The vaginal plate (Pl. XVIII. f. 1. 4) agrees better with those of the members of *Clanis* than with the plate of *dentatus*: the antevaginal part is very restricted, membranaceous, with a low, stronger chitinised, smooth ridge (*acp*) in front of the vaginal orifice (*V*); the postvaginal plate (*pvp*) is very large, this plate visible in the specimens after removal of part of the scaling of the seventh sternite; this armature different, like the eighth tergite, in the different subspecies. The antenna similar to that of ♂, the middle and basal segments much higher than broad; the horizontal diameter of the ventral part of the transsection about half as long as the diameter of the dorsal part.

Larva green, granulose, with two yellowish green dorsal lines and whitish oblique side-bands, granules white, head triangular, horn rather long.—Food-plant: "Lussorah" (N. India), "Tanteitai-lugai" (Philippines).

Pupa not described.

Hab. Ceylon, N.W. India, N. India, China, Philippines, probably also on the Sunda Islands.

The five subspecies are nearly all so very different in the structure of the sexual armature (compare Pl. XXV. f. 2, and Pl. XXXIV. f. 7. 8. 9. 10) that one might be induced to consider these forms as being specifically distinct. But as they are clearly geographical representatives of one another, and as, further, the material in collections is quite insufficient to show us the range of variation of these individually variable forms—only from N. India a series of specimens is available—we treat them as subspecies.

a. P. trilineatus luteatus subsp. nov.

♂♀. Body and wings cinnamon-isabella colour, or cinereous-grey. Markings as in *trilineatus undatus*, but the dentate line between the discal and postdiscal lines of the forewing nearly as distinct as in *dentatus*. The distal margin of the forewing not scalloped, convex in middle.

♂. Tenth abdominal tergite (Pl. XXV. f. 4) much shorter than in *trilineatus undatus*, the sternite higher, more strongly chitinised, the distal edge slightly bisinuate, with a short, narrow, mesial lobe. Clasper divided into a dorsal and ventral lobe (Pl. XXXIV. f. 8), but the incision not so deep as in *trilin. undatus*, and the lobes differently shaped: the ventral one especially disagreeing in being rounded and provided before the end with a transverse fold which inclines apicad and gives the lobe the appearance of being transversely cleft; the ventral unpair process common to the two harpes is apically bent towards the right side (Pl. XXXIV. f. 10); the figure gives the process in a dorsal view, and shows the connection between it and the processes of the penis-funnel (*pdr* and *pdl*); the process *pdr* is either acute, as in figure, or obtuse.

♀. The eighth tergite has no special armature on the dorsal surface, the

pyramidal cone of *trilin. undatus* being represented by a mere swelling. The vaginal armature not preserved in the only ♀ seen, which is stuffed with cotton-wool by the collector.

Hab. Ceylon.

1 ♂ in the Tring Museum (*type*); 1 ♂, 1 ♀ in the British Museum.

b. P. trilineatus trilineatus.

Polyptychus timesius, Butler (*non* Stoll, 1790). *Trans. Zool. Soc. Lond.* ix. p. 584. n. 2 (1877) (Massuri, ♀).

**Polyptychus trilineatus* Moore, *Proc. Zool. Soc. Lond.* p. 390 (1888) (Dharmsala, ♀ :—Mus. Brit.); Butl., *Illustr. Typ. Spec. Lep. Het. B. M.* vii. p. 25. t. 121. f. 4 (1889); Cot. & Swinh., *l.c. Add.* p. 727. n. 133 A (1889); Kirby, *Cat. Lep. Het.* i. p. 706. n. 9 (1892) (Dharmsala).

Polyptychus dentatus, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 69. n. 90 (1892) (partim).

♀. The type-specimen differs from the other subspecies especially in the following points:

Forewing, *above:* the discal line very faint, more proximal than in the other forms, touching lower angle of cell, postdiscal line also more proximal, crossing R^2 about 8 mm. from the distal margin and 9 mm. from the cell; no dentate line between discal and postdiscal lines. *Underside:* fore- and hindwing without discal line, the postdiscal line of forewing more proximal than in the other forms, on hindwing a little nearer cell at R^1 than distal margin. Eighth tergite with pointed pyramidal cones as in *tril. undatus*, but less sinuate: vaginal plate similar to that of *tril. undatus*.

Hab. N.W. India.

1 ♀ in Brit. Museum.

A ♀ from Massuri in the Brit. Museum, ex coll. Moore, agrees in colour and markings with the following subspecies: if the locality is correct, the type of *trilineatus* may turn out to be an aberrant individual, instead of being a representative of a N.W. India subspecies.

c. P. trilineatus undatus subsp. nov.

Smerinthus dentatus, Walker (*non* Cramer, 1777), *l.c.* viii. p. 252. n. 1 (1856) (partim); Horsf. & Moore, *Cat. Lep. Mus. E. I. C.* i. p. 264. n. 609 (1857) (N. India: syn. partim): Moore, *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal); Boisd., *Spec. Gén. Lép. Hét.* i. p. 25. n. 12 (1875) (partim: descr. of larva).

Polyptychus dentatus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 583. n. 1 (1877) (partim): Cot. & Swinh., *Cat. Moths Ind.* i. p. 24. n. 132 (1887) (partim); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 26. n. 102 (1892) (partim): Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 69. n. 90 (1892) (partim); Kirby, *l.c.* p. 706. n. 7 (1892) (partim).

Polyptychus timesius, Butler (*non* Stoll, 1790). *l.c.* p. 584. n. 2 (1877) (partim); Cot. & Swinh., *l.c.* i. p. 24. n. 133 (1887) (partim): Kirby, *l.c.* p. 706. n. 8 (1892) (partim).

Polyptychus modestus, Maassen (*non* Fabricius, 1793), *Stett. Ent. Zeit.* xli. p. 60 (1880) (distinct from *dentatus*: Silhet).

Polyptychus dentatus var. *timesius*, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 406. n. 90 (1898) (Sikhim, 1800 ft., viii., one specim.).

♂ ♀. Body and wings olive mummy-brown, with a pinkish grey flush; the disc of the forewing sometimes paler in patches, in which case a brown shadowy band situated beyond the antemedian line becomes more conspicuous.

♂. The complicated genital armature illustrated *in situ* on Pl. XXV. f. 2; the left clasper is taken away and the anal segment intentionally drawn too far away from the penis-sheath, in order to make the figure more clear. The tenth

tergite (*Xd*) appears as a long strong hook, while the sternite (*Xv*) is a small fold ; the length of the tergite as compared with that of *luteatus* can be best seen from Pl. XXV. f. 3. 4. The dorsal lobe of the clasper (*IXd*) is rather weak, apically dilated and bent inwards, irregularly ladle-shaped, the ventral lobe (*IXv*) ends in two heavy teeth ; the unpair process common to both harpes (*pr*) is fishtail-shaped ; the lateral processes of the harpe are very unequal, that of the right harpe (*pdl*) being long and pointed, projecting beyond the ventral edge of the clasper, while the process of the left clasper (*pdr*) is short and more or less obtuse. The needle-like process (*n*) between clasper and tenth sternite very prominent.

♀. Eighth tergite (Pl. XVIII. f. 5) with a sharp prominent cone upon the upper surface at each side, pointing distad. Vaginal armature (Pl. XVIII. f. 1) with a large postvaginal plate (*pvp*) which is very prominent : the distal margin slightly bi-emarginate, the mesial portion somewhat produced and bent ventrad, so that the plate appears mesially almost sinuate in an anal aspect ; the angles of the plate rounded.

Larva described by Boisduval, *l.c.* (see above).

Hab. North India : Assam ; Sikhim : most likely also Bhutan and Burma.

In the Tring Museum 6 ♂♂, 7 ♀♀ from : Khasia Hills ; Cherrapunji, November ; Sikhim (Mandelli).

d. P. trilineatus chinensis subsp. nov.

♀. Only one badly damaged specimen, which is, however, so peculiar in the structure of the copulatory organs that we do not hesitate to make it the type of a name for this new subspecies Large, general colour nearly as dark as in *trilin. undatus*, more ashy grey on body and base of forewing ; forewing with traces of a double submedian line which crosses M at the base of M^1, discal line evenly concave, slightly angled just before inner margin. Upperside of mid- and hindtibia purer white than in *undatus*.

Eighth tergite (Pl. XVIII. f. 8) with an enormously developed, deeply sinuate, irregularly notched and rugate plate, which is homologous to the two cones of the tergite of *trilin. undatus*. The postvaginal plate (Pl. XVIII. f. 4) is also remarkably different in being rather deeply sinuate, with the two lobes rounded.

Hab. China, probably from the Yantse-kiang Region.

One ♀ in the Tring Museum.

e. P. trilineatus philippinensis subsp. nov.

Polyptichus dentatus, Semper (*non* Cramer, 1777), *Schmett. Philipp.* ii. p. 391. n. 22. t. 1. f. 4 (larva) (1896) (synon. excl. ; Luzon. 1 specim., Febr.).

Polyptychus timesius, id. (*non* Stoll, 1790), *l.c.* p. 392. n. 23 (1896) (Mindanao, coll. Staudinger).

♂♀. Almost as grey as *dentatus* : distal margin of forewing not scalloped, convex in middle, concave below apex and before hinder angle ; mid- and hind-tibiae and -tarsi white above.

♂. Upper lobe of clasper rounded, projecting beyond the lower lobe, which is obliquely truncate with the ventral angle somewhat produced (Pl. XXXIV. f. 9) ; the unpair process *pr* found in the other subspecies is here deeply divided into a narrow and shorter right piece and a longer and broader, apically pointed and somewhat denticulated, left blade (Pl. XXXIV. f. 7) ; this structure shows that

the unpair organ has originated by the ventral processes of the two harpes fusing basally and the distal portion of the left process aborting.

♀. Structure not examined.

Larva figured by Semper: the horn is said to be white (but is green in figure); the yellow line of the right side is too far down in figure, and the yellow dots or setae along the back are apparently meant to represent the yellow line of the left side, the figure representing doubtless a semi-dorsal view of the caterpillar incorrectly drawn.

Hab. Manila, Luzon, 1 ♂ (in bad condition) in the Berlin Museum, collected by Jagor, *type*: 1 ♂, 1 ♀ from Davao or., Mindanao (Platen), in coll. Staudinger: one crippled specimen from Luzon in coll. Semper.

196. **Polyptychus dentatus.**

Sphinx dentatus Cramer, *Pap. Ex.* ii. p. 42. t. 125. f. G. (1777) (Coromandel): Goeze, *Ent. Beytr.* iii. 2. p. 223. n. 70 (1780) ("f. n." ex err.).

Sphinx dentata, Fabricius, *Spec. Ins.* ii. p. 143. n. 16 (1781): id., *Mant. Ins.* ii. p. 94. n. 18 (1787): Gmel., *Syst. Nat.* i. 5. p. 2375. n. 60 (1790): Fabr., *Ent. Syst.* iii. 1. p. 361. n. 19 (1793).

Sphinx timesius Stoll, in Cram., *Pap. Ex. Suppl.* p. 172. t. 40. f. 1 (1790) (Coromandel).

Sphinx modesta Fabricius, *Ent. Syst.* iii. 1. p. 356. n. 4 (1793) (Tranquebar): Boisd., *Spec. Gén. Lép. Hét.* i. p. 557 (1875); Anriv., *Ent. Tidskr.* xviii. p. 151. n. 77 (1897) (typus in Mus. Kopenhagen).

Polyptychus dentatus, Hübner, *Verz. bek. Schm.* p. 141. n. 1514 (1822): Butl., *Trans. Zool. Soc. Lond.* ix. p. 583. n. 1. (1877) (partim); id., *Proc. Zool. Soc. Lond.* p. 154. n. 36 (1883) (Belgaum; Mhow, x.); Fors., *Trans. Ent. Soc. Lond.* p. 395 (1884) (Mhow: larva: habits); Swinh., ibid. p. 290. n. 23 (1885) (Poona, xii.: Belgaum: Bombay, x. xi.); id., *l.c.* p. 435. n. 11 (1886) (Mhow, x.): Cot. & Swinh., *Cat. Moths Ind.* i. p. 24. n. 132 (1887) (partim); Swinh., *Journ. Bombay N. H. Soc.* iii. p. 119. n. 12 (1888) (Karachi, x.); id., *Cat. Lep. Het. Mus. Ox.* i. p. 26. n. 102 (1892) (partim); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 69. n. 90 (1892) (partim): Kirby, *Cat. Lep. Het.* i. p. 706. n. 7 (1892) (partim).

Polyptychus timesius, Hübner, *l.c.* n. 1515 (1822); Butl., *Trans. Zool. Soc. Lond.* ix. p. 584. n. 2 (1877) (partim); Maass., *Stett. Ent. Zeit.* xli. p. 60 (1880) (= ♀ of *dentatus*); Cot. & Swinh., *l.c.* i. p. 24. n. 133 (1887) (partim); Kirby, *l.c.* p. 706. n. 8 (1892) (partim).

Smerinthus dentatus, Lepell. & Serv., *Enc. Méth.* x. p. 441. t. 66. f. 3 (1825); Walk., *List Lep. Het. B. M.* viii. p. 252. n. 14 (1856) (partim, synon.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 25. n. 12 (1875) (partim; = *timesius*).

Smerinthus timesius, Walker, *l.c.* viii. p. 252. n. 15 (1856) (=*dentatus* var.?).

Smerinthus denticulatus (!), Hearsey, *Proc. Ent. Soc. Lond.* (3). i. p. 100 (1864) (larva mentioned, on *Cordia sebistena*).

♂♀. Whitish cinereous. The postdiscal and discal lines of the forewing parallel, straight, the former, not curved distad beyond R^2, the dentate line between them distinct. The figures of *dentatus* and *timesius* agree with this insect, and the type of *modesta* is said by Aurivillius, who has examined it at Kopenhagen, to belong here.

♂. Tenth tergite (Pl. XXV. f. 5, dorsal view) not strongly narrowed to the end, the apex sinuate, with the angles pointed; the sternite developed to a large mesial plate which is deeply sinuate, with the lobes rounded at end. Clasper sole-shaped (Pl. XXXIV. f. 6); no organ of friction; the harpe with two processes: one submesial (*pm*), short, somewhat twisted, curved upwards, the widened part concave, the process being more or less ladle-shaped; the other long (*pr*), ventral, not quite so long as the clasper, pointed, somewhat curved at the end, the ventral processes of the two claspers not fused together as in *trilineatus*. Penis-sheath without armature, less stout than in *trilineatus*; the processes (*n*) found in the latter species between clasper and tenth sternite are absent from *dentatus*.

♀. Antennal segments less deeply grooved than in *trilineatus*. The eighth tergite of the abdomen (Pl. XVIII. f. 6) trilobate, the middle lobe, however, very short, all three strongly rounded. The vaginal plate (Pl. XVIII. f. 2) very remarkably different from that of *trilineatus*; the orifice is postmedian (*I*); before it the plate is convex, raised at the orifice into a thick, rather glossy ridge, which is convex mesially, forming a short mesial lobe; this ridge is visible without dissection after the removal of the scales at the edge of seventh sternite; the postvaginal plate (*pvp*) is not strongly chitinised, sunken, triangular.

Larva and pupa mentioned by Hearsey and Forsayeth, *l.l.c.c.*, not sufficiently described.—Food-plant: "Lasora" or "Gaudi" trees; *Cordia sebistena*.

Pupa (in Brit. Mus. from Mhow) glossy; tongue-case shorter than foreleg; abdominal segments 2 to 7 with a transverse lateral sulcus at the base, the last three sulci with a series of deep round punctures; cremaster rather smooth, bifid.

Hab. Ceylon and South India, as far north as Karachi and Calcutta.

In the Tring Museum 1 ♂, 4 ♀♀ from: Deesa; Karachi; Calcutta.

197. Polyptychus grayi.

**Smerinthus grayi* Walker, *List Lep. Ins. B. M.* viii. p. 249. n. 11 (1856) (Natal;—Mus. Brit.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 26. n. 13 (1875) (Natal).

Polyptychus grayi, Butler, *Trans. Zool. Soc. Lond.* ix. p. 584. n. 4 (1877) (Natal); Kirby, *Cat. Lep. Het.* i. p. 705. n. 3 (1892) (Natal).

♂♀. Tongue reduced to two tubercles (Pl. LXII. f. 1). Bristles of pilifer partly replaced by hair-scales. Joint between segments 1 and 2 of palpus open. Antennal segments sub-andromorphic, the grooves much shallower than in the two Indian species. Spurs of mid- and hindtibia not spinose. Distal margin of forewing irregularly scalloped, similar in the sexes: R^2 of hindwing before centre of cell, D^3 much longer than D^1; base of forewing with black dot. Clasper and eighth tergite *with* organ of friction. Abdominal tergites spinose at the edges, with some lanceolate pointed scales all over, besides large multidentate underscales.

♂. Tenth tergite (Pl. XXV. f. 6) broad, gently curved downwards, apex with a small rounded sinus, the lobes very short, pointed; sternite (*Xe*) elongate triangular, deeply cleft, the lobes close together, pointed. Clasper entire (Pl. XXXIV. f. 11), sole-shaped, apex rounded; with a large friction-patch of narrow bidentate scales, which gradually assume the form of the ordinary scales, each scale longitudinally impressed mesially, this giving the scaling of the patch a rough appearance; the eighth tergite with a corresponding organ of friction consisting of several rows of scales closely packed together, these scales moderately enlarged, about three to five times as long as broad; the outwardly naked ventro-basal portion of the clasper separated ventrally by an incision from the scaled part, the former representing the basal part of the harpe, which is produced distally into a long, pointed, slightly twisted process, which is almost vertical on the plane of the clasper, inclining basad (Pl. XXXIV. f. 11); the hook is situated in the middle of the clasper and is clothed dorsally at and near the edge with a great number of short bristles. Penis-sheath (Pl. XXX. f. 41) very slender, without armature, protruding from a long penis-funnel (P-F), which is produced into two lobes.

♀. The eighth tergite (Pl. XVIII. f. 8) somewhat resembles that of *dentatus* deeply and roundedly sinuate, the lobes broad and rounded. Vaginal armature represented by fig. 3, Pl. XVIII.; the vaginal cavity *I* very large, proximally bordered by a rather high, wrinkled, transverse ridge which is incised mesially,

with the lobes bordering the sinus triangular and somewhat projecting; post-vaginal plate (*prp*) transverse, not strongly chitinised, distally broadly rounded.

Larva green, granulose, a dorso-lateral series of pointed tubercles from pronotum to horn. Head produced dorsad into a long process, which is sinuate at end; in last stages the process has disappeared, the head becoming only moderately triangular. Horn first long and slender, straight; in later stages rather short and stout, curved.

Hab. S.W. Africa, Cape Colony northwards to British East Africa.

Two subspecies:

a. P. grayi grayi.

**Smerinthus grayi* Walker, *l.c.*

♂♀. This form only has been dissected by us; the above description of the structure of the sexual armature applies, therefore, to the present subspecies. The third antemedian line of the forewing, above, is undulate, the brown marginal area of the upperside does not reach hinder angle, and that of the underside is of nearly the same tint from the apex of the forewing to the anal angle of the hindwing. The dot at the base of the forewing is mostly double, or the dots are fused to one; seldom is one of them absent.

Hab. Cape Colony to British East Africa.

In the Tring Museum 23 ♂♂, 11 ♀♀ from: Natal (Spiller, Leigh); Namaqualand; several larvae.

In the British Museum also from British East Africa.

b. P. grayi assimilis subsp. nov.

♀. Forewing narrower than in the preceding form; basal dot minute; third antemedian line almost straight, first discal line less straight than in *grayi*; brown marginal area extending to hinder angle, its inner edge almost evenly curved; marginal area of underside of both wings not distinctly browner than disc, except below apex of forewing and at anal angle of hindwing. Structure of the eighth tergite and of the vaginal armature not examined.

Hab. Rietfontein, German S.W. Africa, March 1897 (Borchmann), 1 ♀ in the Berlin Museum, *type*; Bechuanaland, 1 ♀ in coll. Staudinger.

198. **Polyptychus digitatus.**

Smerinthus dentatus, Dewitz (*non* Cramer, 1777), *Mitth. Münch. Ent. Ver.* i. p. 27 (1879) (Chinchoxo).
**Polyptychus digitatus* Karsch, *Ent. Nachr.* xvii. p. 14. t. 1. f. 3 (1891) (Chinchoxo;—Mus. Berlin); Kirby, *Cat. Lep. Het.* i. p. 706. n. 6 (1892) (W. Africa).

♂♀. Tongue reduced to two tubercles as in *grayi*. Palpus and antenna as in *grayi* (the antenna too heavy in figure of type). Differs from *grayi* in the following points: Forewing; the basal dot replaced by a short inconspicuous line; antemedian lines 1 and 2 + 3 converging costad; the brown apical area not narrowed to a point at the apex of the wing, but remaining here several mm. broad; a brown arc alike this also present on the underside, but here smaller, stopping at R^3, rather sharply defined; the hindwing, below, dark brown at apex as well as at anal angle, the postdiscal line less curved than in *grayi*.—Not dissected.

Hab. West Africa: Angola; Cameroons.

In the Berlin Museum 1 ♂ from Chinchoxo, *type*.

In coll. Druce 2 ♂♂, 1 ♀ from Cameroons. In one of these ♂♂ the first discal line of the forewing, above, runs across the stigma, being much more proximal than in the normal specimens.

199. **Polyptychus virescens.**

**Pseudosmerinthus virescens* Butler, *Ann. Mag. N. H.* (5). x. p. 435 (1882) (Aburi;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 703. n. 7 (1892).

♂. Tongue weak, reaching to end of forecoxa. Palpus with open joint. Antennal segments with straight ventral outline (side-view). Spurs not spinose, longer terminal one of hindtibia less than half the length of the first tarsal segment. Distal margin of forewing entire, straight; hindwing: anal angle not produced, D^2 three times as long as D^3. Abdomen like thorax, woolly, the tergites rather densely spinose all over, the spines long, denser at the apices. Clasper without friction-patch.

Tenth tergite (Pl. XXV. f. 7) not divided, the apical half rather abruptly narrowed, forming a pointed hook, which is, however, not strongly curved downwards; sternite mesially membranaceous, laterally stronger chitinised and produced into a slender pointed process (Pl. XXV. f. 7, *Xv*). Clasper sole-shaped; harpe consisting of a plate of chitin which is not much raised above the plane of the clasper, but is ventro-distally produced into a very long, slender, strongly chitinised process, which curves ventro-distad and mesiad, protrnding beyond the ventral edge of the clasper. Penis-funnel dorsally produced into two pointed processes, resembling the tenth sternite; penis-sheath with a very peculiar armature consisting of a long, strong, curved thorn which is almost vertical upon the sheath (Pl. XXX. f. 38).

♀ and early stages not known.

Hab. West Africa: Gold Coast and Congo; doubtless more widely distributed.

In the Tring Museum 1 ♂ from the Upper Congo.

Rare in collections.

200. **Polyptychus trisecta** (Pl. I. f. 5, ♂).

**Ambulyx trisecta* Aurivillius, *Ent. Tidskr.* xxii. p. 119. n. 91 (1901) (Congo, ♂ :—Mus. Bruxelles).

♂. Tongue rather strong, as in *carteri*, *coryndoni*, etc. Palpi compressed, less broad apically in dorsal view than in the allied species, the joint not distinctly open. Antenna thickest between base and middle, the ventral outline even. Spurs not spinose, very long, long terminal one of hindtibia as long as the tibia. Abdominal tergites not spiny, excepting edges. Distal margin of forewing entire, apex strongly produced, hinder angle produced backwards; D^2 of hindwing not much longer than D^3, both very oblique, D^3 nearly twice as long as D^4. Clasper and eighth tergite with organ of friction.

Tenth tergite (Pl. XXV. f. 10) very long and very slender, slightly compressed, gradually curved downwards, apex rather obtuse: sternite (*Xv*) produced into a broad rounded lobe, which is somewhat constricted basally. Clasper (Pl. XXXIII. f. 18) broadly sole-shaped; dorsal half of outer surface *without* scaling, the naked area covered with dispersed elongate granules, which are smaller and very dense at the incrassate margin of the clasper; these granules replace the friction-scales of the allied insects; the eighth tergite bears a series of large friction-scales on the innerside as illustrated on Pl. LVIII. f. 39; the harpe is

produced into two broad processes : the ventral one slightly curved upwards, concave, the upper one obliquely truncate, with a tooth at the dorsal edge, both processes covered with very short bristles on the inner surface. Penis-sheath (Pl. XXX. f. 31) with a very long apical process which is spatulate.

♀ and early stages not known..

Hab. Zongo, Mokoanghay, Congo (Tilkens), 1 ♂ in the Musée Royal at Bruxelles, here figured.

201. **Polyptychus orthographus** spec. nov. (Pl. I. f. 9, ♂).

♂. Smaller than *trisecta*, more buffish in tint, head and pronotum without dark brown mesial line ; palpus paler at the end than at the sides.——Forewing, *above*, with a pale, short, subbasal line, parallel with the antemedian line, which is more straight than in *trisecta* ; stigma prominent, brown, with pale centre ; postdiscal line more curved ; a distinct line of lunules between discal and postdiscal lines ; apex of wing much less produced and hinder angle more acute than in *trisecta*.——Hindwing: fringe rather more extended white between the veins, disc paler.

Underside : instead of the entire, non-dentate, postdiscal line of *trisecta* there are in *orthographus* two dentate lines, the external one accentuated by dots upon the veins and situated nearer margin than the line of *trisecta*, especially in the apical region of the hindwing ; the posterior veins of both wings dotted with white outside the postdiscal line.

Palpus broader at end than in *trisecta*, joint somewhat open. Spurs long, very unequal, but decidedly shorter than in *trisecta*, the long terminal spur of the hindtibia shorter than the tibia, the latter shorter than the first tarsal segment ; abdomen without spines, except at the edges of the segments. R^2 of hindwing from centre of cell. Tenth tergite (Pl. XXV. f. 9) long, as in *trisecta*, slightly dilated at the end ; sternite truncate, with the angles rounded. Clasper (Pl. XXXIII. f. 19) broadly sole-shaped ; outer surface not scaled dorsally, the naked area densely covered with minute elongate granules ; eighth tergite with friction-scales as in *trisecta* ; harpe with three processes instead of two, the ventral one the broadest, the inner surface of all covered with short bristles ; the upper basal process homologous to the short tooth of the harpe of *trisecta*. Process of penis-sheath (Pl. XXX. f. 39) comparatively shorter than in *trisecta*, not dilated apically.

♀ and early stages not known. Length of forewing : 33 mm.

Hab. West Africa.

In the Tring Museum 2 ♂♂ from : Bopoto, Congo (K. Smith), *type* ; Old Calabar.

In the British Museum 1 ♂ from Old Calabar.

202. **Polyptychus carteri** (Pl. X. f. 8, ♀).

**Pseudosmerinthus carteri* Butler, *Ann. Mag. N. H.* (5). x. p. 435 (1882) (Aburi ;—Mus. Brit.) ; Kirby, *Cat. Lep. Het.* i. p. 703. u. 6 (1882) (Aburi).

♂♀. Tongue present, rather strong, visible between the palpi when rolled in. Joint between first and second segment of palpus open. Antenna of ♀ andromorphic. Spurs of mid- and hindtibia not spinose. Distal margin of forewing dissimilar in the sexes, much more convex in middle in ♀ than in ♂, not dentate, apex produced, pointed ; D^2 of hindwing twice as long as D^3, very oblique, this

as long as D¹. Abdomen with broad underscales, spines only at the apices of the tergites. Clasper and eighth tergite with organ of friction. Forewing, above, with three lines, almost equally distributed at costal margin between base and apex, a trace of a fourth line between the first and second ; basal spot large, another large spot at inner margin close to angle ; stigma grey, edged with brown.

♂. Tenth tergite (Pl. XXV. f. 8) broad, sinuate, the two lobes rounded externally, angled internally ; sternite (*Xr*) cleft into two lobes, which are more than twice as long as broad ; the lobes are directed anad, diverging somewhat ; their broad sides are almost vertical, not horizontal. Clasper (Pl. XXXIV. f. 4) irregularly sole-shaped, ventral margin distally more oblique than dorsal margin ; the friction-patch consists of small lanceolate scales, and occupies the greater part of the dorsal surface of the clasper ; the friction-organ of the eighth tergite consists of a row of large scales covering one another sideways for the greater part, similar to the row of scales of *trisecta* (Pl. LVIII. f. 39) ; the harpe has a dorso-basal, long, spine-like process *pd*, and two distal processes : the ventral one is the prolongation of the ventral ridge *vc* ; above this there is a short hook, the tip of which is visible in figure ; the second process is longer, curved upwards, spinose, it stands in connection by folds with the ventral ridge as well as with the dorso-basal process. Penis-funnel (P-F) produced dorsally into a long, flat, pointed blade ; penis-sheath armed at the end with a long, movable, slender process which lies over the mouth of the sheath (Pl. XXX. f. 36).

♀. Eighth abdominal tergite (Pl. XVII. f. 16) broadly rounded dorsally, the sides projecting as triangular lobes The vaginal plate (Pl. XVII. f. 15) similar to that of *grayi* in the rather high antevaginal ridge *arp* being incised mesially ; the postvaginal plate *prp* membranaceous.

Early stages not known.

Hab. West Africa : Sierra Leone ; Gold Coast ; Cameroons.

In the Tring Museum 1 ♂, 1 ♀ from Sierra Leone.

In coll. Charles Oberthür 2 ♂♂ from Johann Albrechts Höhe, Cameroons (Conradt).

203. **Polyptychus goodi.**

Polyptychus goodi Holland, *Trans. Amer. Ent. Soc.* xvi. p. 64. n. 21. t. 4. f. 2 (♀) (1889) (Upp. Ogowé R. ;—coll. Holland) ; Kirby, *Cat. Lep. Het.* i. p. 706. n. 5 (1892).

♀. Known to us only from the description and figure. Forewing scalloped ; stigma white with black edge ; apparently no basal dot (?) ; some indistinct ante-median lines, almost straight, more distal behind than in front (as in *Pseudoclanis postica*), and some irregular discal lines ; a blackish distal marginal area ; base at inner margin like disc of hindwing rose-madder.

Length of forewing : 51 mm.

Hab. Ogowé R.

One ♀ in coll. Holland.

204. **Polyptychus pygarga** (Pl. I. f. 8, ♀).

**Dewitzia pygarga* Karsch, *Ent. Nachr.* xvii. p. 295. t. 1. f. 5. 5a (1891) (Cameroons;—Mus. Berlin).
Pseudosmerinthus pygarga, Kirby, *Cat. Lep. Het.* i. p. 703. n. 4 (1892) (Cameroons).

♀. Tongue very short. Joint of palpus more or less open. Antenna (♀) with very slightly prolonged basal and dorsal seriated ciliae, the segments scarcely grooved. Spurs very short, two pairs to hindtibia, with or without a spine before

end. Abdominal tergites with weak spines all over, the spines dense at the edges. Distal margin of forewing entire, apex produced, inner margin sinuate before angle, this produced backwards ; stalk of SC^2 and R^1 of hindwing rather long, D^2 twice as long as D^3, somewhat angled, very oblique, D^3 equalling D^4. Eighth tergite truncate. Vaginal plate (Pl. XVIII. f. 14) characteristic, the antevaginal part (*avp*) membranaceous, folded ; at each side of the vaginal orifice (*V*) there is a strongly chitinised ridge, continued mesiad, ending in front of the orifice, produced into a long, curved, horn-like process (*l*), which is generally visible in the specimens without dissection ; the edge of the ridge irregularly denticulate.

The scales at the edge of the last stigma of the abdomen are white, forming a rather conspicuous spot. Forewing without basal dot. Mid- and hindtibia with a white spot at the base.

♂ and early stages not known.

Hab. Tropical Africa.

Two subspecies :

a. P. pygarga pygarga.

**Dewitzia pygarga* Karsch, *l.c.*

♀. Distal margin of forewing straight from SC^5 to hinder angle.

Hab. West Africa.

In the Tring Museum one bad ♀ from Agberi, Niger, 23. xii. 1901 (Dr. W. J. Ansorge).

A ♀ in the Berlin Museum and another in coll. Chas. Oberthür from Cameroons.

The figure of the genital armature is taken from Mons. Oberthür's specimen.

b. P. pygarga convexus subsp. nov. (Pl. I. f. 8, ♀).

♀. Distal margin of forewing convex between R^2 and hinder angle. Body and wings more pinkish above than in the West African form, underside washed with brick-red ; longer scales of fringe of hindwing white. The ridge connecting, in front of the vaginal orifice, the two horn-like lateral lobes higher than in *pyg. pygarga*.

Hab. M'Pala, Tanganyika (Guillemé).

One ♀ in coll. Charles Oberthür.

This is one of the instances of the East African form having the distal margin of the forewing more convex than the West African form.

205. **Polyptychus affinis** spec. nov. (Pl. I. f. 12, ♀).

Agrees closely with *pygarga pygarga* in the shape of the wings, but differs as follows :

♀. Head and thorax with a darker brown ill-defined middle stripe; the posterior abdominal stigmata with a very few white scales, the last stigma-spot much smaller than in *pygarga*. Forewing with a dark brown subbasal spot. Hindtibia greyish white above from base to apex. Vaginal armature (Pl. XVIII. f. 13) very different from that of *pygarga* ; the postvaginal plate (*pvp*) small, triangular, sunken ; before the vaginal orifice there is a high triangular ridge (*avp*), which ends in two irregular points.

♂. A ♂ in the Standinger collection, also from the Cameroons, belongs perhaps to this species; it is nearly as grey as *grayi* ; the harpe has a long, cylindrical, pointed, horizontal process which projects beyond the end of the clasper ; there

is apparently an organ of friction (the specimen could not be further examined, as dissection was not allowed).

Hab. West Africa: Lolodorf, Cameroons (Conradt).

One ♀ (*type*) in coll. Chas. Oberthür.

Barombi and Interior (Preuss), 1 ♂ and 1 ♀ in coll. Staudinger; this species?

206. **Polyptychus enodia** (Pl. I. f. 6, ♀).

**Basiana enodia* Holland, *Trans. Amer. Ent. Soc.* xvi. p. 66. n. 24. t. 4. f. 3 (1889) (Kangwé:—coll. Holland); Kirby, *Cat. Lep. Het.* i. p. 702. n. 6 (1892) (W. Africa).

♀. Tongue short, but not very weak. Palpus rather stout for a ♀, truncate, pointed in side-view. Antenna andromorphic, strongly compressed, with long fasciculated ciliae. Abdominal tergites not spinose except edges. Tibiae with long scales distally; spurs short, not spinose. Underside of body bright rufous, costal margin of forewing, and the hindwing below, also rufous; tip of abdomen grey. A large subbasal patch on forewing above, the stigma, a patch near apex, another near hinder angle, and on hindwing a transverse patch near anal angle, of a peculiar grey-olive colour. The lines on the forewing above not very distinct, one at base of M^2, the second quite indistinct between M^2 and M^1, the third just beyond base of M^1; the fourth on disc, dentate at the veins; on the underside there are two large yellow patches on the disc of the forewing between R^3 and M^2. Hindwing, below, with a dentate line just beyond cell, another two-thirds the way to outer margin; R^2 far below centre of cell, D^2 very oblique, three times as long as D^3, this equal to D^1. Tip of abdomen ashy white.

Hab. Kangwé, Ogowé R.

One ♀ in coll. Dr. Holland, here figured.

207. **Polyptychus falcatus** spec. nov. (Pl. X. f. 12, ♀).

♀. Head small; tongue short and weak. Joint of palpus open. Spurs of mid- and hindtibiae spinose; hindtibia as long as tarsal segments 1 and 2, with brush of long scales between the two pairs of spurs. Antenna heavily ciliated, strongly compressed and grooved. Forewing strongly produced at apex, which is acute, outer margin slightly dentate at R^2, evenly sinuate between apex and R^2; hindwing dentate, especially at posterior veins; D^2 of hindwing very oblique, twice as long as D^3, this as long as D^1. Abdominal tergites spinose all over, without large underscales.

Body, *above*, pale grey, abdomen with some black dispersed scales; underside buffish; mid- and hindtibiae with a white dot at base on upperside.

Wings, *above*, sprinkled over with single black scales.——Forewing pale grey, crossed by blackish brown lines; a thin line at costal margin near base, followed behind cell by two rather heavy dots, three antemedian lines, curving costad, oblique and almost straight from cell to internal margin, the first 2 mm. proximal of M^2, the second at base of M^2, and the third 2 mm. beyond M^2, the interspace between lines 2 and 3 filled up by blackish scaling, which forms together with the lines a band that is narrowest behind; a vestige of a blackish stigma; three, almost parallel, discal lines, rather close together, the middle one at juncture of SC^4 and SC^5, the interspaces more or less blackish, the band thus formed broadest at R^1, measuring here 5 mm., while at M^2 the band is only $2\frac{1}{2}$ mm. broad, slightly curving costad in front, feebly concave behind; a dentate postdiscal line, nearly parallel to the discal

ones, 11 mm. from apex at costal margin, the points of the line upon the veins marked by tiny dots, except on M^2 and SM^2, where the dots are isolated; a submarginal series of minute dots upon the veins, somewhat nearer the postdiscal line than the outer margin, last two dots placed in a small blackish cloud; marginal area blackish, except at apical and internal angles.——Hindwing buff, a feeble discal line just outside cell, followed immediately by traces of a second line; a postdiscal zigzag line following the curve of the wing, but anteriorly a little farther away from the margin than behind, distances at R^1 and M^2 being 5 and 4 mm. respectively, a submarginal series of dots joined to one another by black scales, edge of wing also black, marginal area down to postdiscal line densely powdered with black scales, abdominal fold and anal angle more grey than disc.

Underside buff-colour, speckled with black scales (except basal half of forewing), outer area of forewing and abdominal area of hindwing greyish.——Forewing: no lines in basal half: three rather broad but not heavily marked discal lines, dentate, obsolete behind, a little more distal than on upperside; a dentate postdiscal line, feeble, marked with dots upon the veins; the vestige of a submarginal line, represented at costal margin by a thin line and upon the veins by more or less obsolete dots; with this line is fused a black curved streak running from apex of wing across SC^5 and R^1.——Hindwing: lines situated as above, discal one better marked, postdiscal one feebler.

Eighth tergite (Pl. XVIII. f. 10) shallowly bi-emarginate. Vaginal armature peculiar (Pl. XVIII. f. 9); at each side of the vaginal orifice (*l*) there is a high ridge produced into prominent teeth, the armature resembling in a ventral aspect (like figure) the horns of an elk to a certain extent; proximally of this armature there is at each side a rather deep smooth cavity (*c*); the postvaginal plate (*prp*) is feebly chitinised.

Length of forewing: 41 mm.; breadth, 17 mm.

Early stages not known.

Hab. Salisbury, Mashonaland.

One ♀ in the Tring Museum.

208. **Polyptychus rhadamistus** (Pl. IX. f. 6, ♂).

Sphinx rhadamistus Fabricius, *Mant. Ins.* ii. p. 93. n. 10 (1787) (Sierra Leone;- Mus. Kopenhagen); Auriv., *Ent. Tidskr.* xviii. p. 151. n. 8 (1897) (descr. of *type*).
Sphinx? rhadamistus, Walker, *List Lep. Het. B. M.* viii. p. 263 (1856).
Diadosida? rhadamistus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 554. n. 4 (1877).
Polyptychus rhadamistus, Kirby, *Cat. Lep. Het.* i. p. 705. n. 2 (1892) (partim).

♂ ♀. Tongue short and weak. Palpus with open joint. Antennal segments of ♀ andromorphic, ciliae rather long. Spurs short, not spinose, longer terminal one of hindtibia less than half the length of the first tarsal segment. Abdominal tergites without broad underscales. Distal margin of forewing entire, apex produced, acute; anal angle of hindwing produced, apex evenly rounded; SC^2 and R^1 on a stalk, D^2 very oblique, three times as long as D^3, this like D^4.

Forewing with black basal dot; stigma vestigial, no lines between base and discal line.

Under surface.——Forewing grey in distal marginal area, an evenly curved brown discal line from costal margin to M^1 or beyond, corresponding to the line of the upperside; a brown patch, proximally ill-defined at inner margin, bordering grey area.——Hindwing with S-shaped, brown, even line just outside cell, a second

dentate line between it and outer margin, feeble, accentuated by dots upon the veins, this line continued over forewing, where it is still more faint.

♂. Tenth tergite broad in basal half, then suddenly narrowed to a strong pointed hook; no sternite. Clasper peculiar: proximal half broad, apical half much narrower, curved upwards, a deep sinus in the dorsal margin, the ventral and dorsal margins of the proximal half and the ventral margin of distal half raised to form ridges, the proximal ridges hairy. Harpe a long evenly-curved hook; no friction-scales. Penis-sheath without armature; below the penis-sheath a short, horizontal, pointed, conical process.

♀. Not dissected: differs from ♂ only in the subapical spot of the forewing being larger.

Early stages not known.

Hab. West Africa: Senegal to Cameroons.

In coll. Charles Oberthür, 1 ♀ from Johann Albrechts Höhe, Cameroons; 2 ♂♂ from Misahöhe, Togo, 1. iv. 1894 (Baumann). From Sierra Leone in the Berlin Museum; 2 ♂♂ from Cameroons and Senegal in coll. Standinger; 3 ♂♂ in the Tring Museum from Agberi, Niger, 4. vii. 1901, 4. viii. 1901, 11. ix. 1901 (Dr. W. J. Ansorge).

209. **Polyptychus boisduvali.**

**Temnora rhadamistus*, Boisduval (*non* Fabricius, 1787), *Spec. Gén. Lép. Hét.* i. p. 290. n. 1. t. 9. f. 1 (1875) (Sierra Leone;—coll. Charles Oberthür); Butl., *Trans. Zool. Soc. Lond.* ix. p. 632 (1877).

Polyptychus rhadamistus, Kirby, *Cat. Lep. Het.* i. p. 705. n. 2 (1892) (syn. partim).

Temnora boisduvali Aurivillius, *Ent. Tidskr.* xviii. p. 152. sub n. 78 (1897) (nom. nov. loco *rhadam.*).

♀. Tongue short and weak. Palpus small (♀), joint open. Frons with a tuft in front of the antenna. Antenna distinctly grooved, except distal segments, with prolonged ciliae. Abdomen with weak spines all over the tergites. Spurs not spinose, short, with long naked point, longer terminal spur of hindtibia not much longer than the tibia is broad. Distal margin of forewing irregularly dentate; hindwing feebly dentate at the posterior veins, D^2 twice as long as D^3. Vaginal plate (Pl. XVIII. f. 11) with a large, smooth, tuberculiform, antevaginal plate (*avp*) which is membranaceous in the middle with the edge more or less sinuate; between this plate (*avp*) and the vaginal orifice (V) there is a smaller, convex, tuberculiform piece of chitin; postvaginal part of plate (*pvp*) very short.

This species resembles *rhadamistus* of Fabricius somewhat in the pattern of the forewing, but is quite distinct.

Hab. West Africa: Sierra Leone and farther south.

In several collections. One ♀ without locality in the Tring Museum; this specimen is aberrant in having the antennal segments rounded, cheese-shaped.

210. **Polyptychus andosa** (Pl. II. f. 9, ♂; 12, ♀).

**Pamacra andosa* Walker, *List Lep. Het. B. M.* viii. p. 159. n. 7 (1856) (Sierra Leone;—Mus. Brit.).

Temnora andosa, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 291. n. 3 (1875) (S. Leone).

Polyptychus andosus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 584. n. 5 (1877) (S. Leone).

Pseudosmerinthus andosa, id., *Ann. Mag. N. H.* (5). x. p. 435. sub n. 8 (1882).

Pseudosmerinthus (?) *andosa*, Kirby, *Cat. Lep. Het.* i. p. 703. n. 8 (1892) (S. Leone).

♂. Tongue and palpus as in *coryndoni*; antenna (♂) much thinner, ventral line even (in side-view). Spurs short, not spiny, longer one of midtibia only as long as the tibia is broad. Abdominal tergites not spinose, excepting edges. D^2

of hindwing twice as long as D^3, this equal in length to D^1; distal margin of forewing entire, apex produced, middle convex.

Differs in colour and shape from *coryndoni* as follows :——Forewing with two brown basal dots and a minute brown stigma, discal lines closer together, dentate, the teeth of the first directed basad, of the second directed distad, followed by a series of vein-dots, the last enlarged ; outer margin less convex, apex more acute, inner angle much less obtuse, about 90°.——Hindwing more produced at anal angle, the dots before the angle more proximal.——*Underside :* the two lines blackish brown, the external one accentuated by dots, the inner one of the hindwing more straight.

Tenth abdominal segment as in *coryndoni*, the tergite narrower, less rounded laterally, and the lobe of the sternite somewhat larger (Pl. XXV. f. 14). Clasper sole-shaped ; patch of friction-scales as in *coryndoni*, but the scales more densely placed ; harpe (Pl. XXXIII. f. 20) with three processes : one (*pv*) as in *coryndoni*, triangular, appearing as a process of the clasper, the second and third prolonged, resembling somewhat the processes of *trisecta*, with which they are homologous, the lower one straight, somewhat dilated at the obtuse end, the upper one curved, both concave, rough with minute tubercles or setae ; these processes correspond to the two lobes of the sinuate upper process of *coryndoni*. Penis-funnel (P-F, Pl. XXX. f. 35) dorsally prolonged and divided into two long pointed blades ; penis-sheath with long apical process which becomes gradually thinner towards end.

♀. Antenna slightly compressed, not distinctly grooved, the basal seriated ciliae prolonged. More tawny than ♂. Distal margin of forewing more convex in middle than in ♂, the apex more produced and the hinder angle more obtuse, the lines much more indistinct both above and below, the veins of the hindwing very slightly darker than the cellules between them ; anal dots more distal ; discal line of hindwing below rather closer to cell. Eighth tergite mesially rounded, projecting. Vaginal plate (Pl. XVII. f. 14) not strongly chitinised, postvaginal part membranaceous, antevaginal part convex, wrinkled excepting middle, edge broadly sinuate.

Early stages unknown.

Hab. Sierra Leone.

In the British Museum 1 ♂ (*type*); in the Tring Museum 1 ♂, 1 ♀, the ♂ from Freetown, 4. ix. 1899 (Austen), received in exchange from the British Museum.

211. **Polyptychus consimilis** spec. nov.

♂. Close to *compar* in colour ; very different in the sexual armature.

Wings, *above* ; basal dot of forewing larger than in *compar*, discal lines less oblique behind, slightly curved basad behind R^3, distal margin not convex behind middle ; hindwing paler in colour, more buff.——*Underside :* lines more distinct, especially the first of the hindwing, D^3 of the hindwing longer than D^1.

Tenth tergite (Pl. XXV. f. 11) elongate-triangular, strongly narrowed to end, pointed, mesially impressed ; no sternite. Clasper (Pl. XXXIII. f. 22) without friction-patch ; dorsal edge naked, incrassate, produced distad into a long denticulate-truncate process (*pdd*) ; ventral part of apex of clasper (*pde*) small, rounded, concave ; harpe (H) incrassate, without processes ; a hairy, feebly chitinised cone (*c*) between the incrassate ventral and dorsal margins of the clasper. Penis-funnel (P-F) obliquely truncate, feebly sinuate ventrally, deeply sinuate dorsally, with long bristles ; penis-sheath with the longitudinal groove of *compar* vestigial ; apex with a multidentate belt (Pl. XXX. f. 34).

♀ and early stages not known.

Hab. Atbara, Abyssinia.

One ♂ (*type*) in the British Museum; another ♂ from Konakry I., in the Paris Museum.

The dorsal lobe of the clasper is in the Konakry specimen much longer than in that from Abyssinia and curved, and the dorsal edge of the clasper is dilated mesiad in the middle. The difference, which is very obvious, may be individual or geographical.

212. **Polyptychus compar** spec. nov.

♂. Similar to *andosa*. Distinguished by the following characters:

Mid- and hindtibiae brownish, with a conspicuous white basal spot. Wings, *above*.——Forewing more vinaceous-grey, *one* basal dot instead of two; stigma a small tawny ring filled up with buff; first discal line (and the two following ones, if present) strongly curved costad in front: distal margin less convex behind middle, not concave before angle, which is less prominent.——Hindwing pale vinaceous-buff, longer than in *andosa*, apex more broadly rounded, distal margin more convex; fringe vinaceous, blackish behind, not spotted, longest scales white; distal area somewhat shaded with brown; veins distally not conspicuously striped with brown.

Underside nearly as in *marshalli* in colour.——Forewing brownish distally, shaded with grey in distal marginal area, lines indistinct, a postdiscal one dentate, accentuated by vein-dots, followed by another series of very faint dots.——Hindwing: first line touching apex of cell, indistinct, postdiscal line dentate, parallel to margin, accentuated by vein-dots, much more curved than in *andosa*; D^3 shorter than D^1.

In the *type* the lines more distinct and the apex of the forewing less produced than in a second specimen, which has a brown streak in the middle before the abdominal margin of the hindwing above.

Clasper and eighth tergite without friction-scales. Tenth tergite large, broad, longitudinally concave above, apex divided into *three* lobes (Pl. XXV. f. 12. 13): the middle lobe narrow, sinuate or truncate, with parallel sides, directed ventrad; side-lobes broad, somewhat twisted, rounded. Clasper short (Pl. XXXIII. f. 23), dorsal margin sinuate before end, ventral margin rounded distally, sinuate beyond middle owing to the harpe projecting ventrad; a prominent subdorsal fold, beset with long bristles; ventral part of harpe subprismatical, concave, upper edge raised; an oblique ridge extending dorsad, raised mesially into a large triangular tooth; proximally of this tooth there is a large, feebly chitinised, setose cone. Penis-funnel (P-F) deeply and broadly unisinuate ventrally, dorsally trisinuate, the mesial sinus small; penis-sheath with a curved longitudinal furrow; no process, but apical margin with a multidentate belt all round (Pl. XXX. f. 33A. 33B).

♀ and early stages not known.

Hab. Mashonaland.

Two ♂♂ in the British Museum, one (*type*) from Salisbury, October 1900 (Marshall), the other from Umtali.

213. **Polyptychus coryndoni** spec. nov. (Pl. II. f. 7, ♂).

♂. Tongue rather strong, visible between the palpi; the joint of these open. Antenna subserrate ventrally (Pl. LX. f. 26). Spurs not spiny, long one of midtibia more than twice as long as the tibia is broad. Cross-veins of hindwing as in *carteri*; distal margins of forewings not dentate, apex produced, middle convex.

Abdominal tergites not spinose except at edges. Forewing without basal dot. Eighth tergite and clasper with organ of friction.

♂. Body ecru-drab; palpus somewhat darker, washed at the side with rosy red; anterior coxa buffish; antenna very strongly ciliated, the non-scaled lateral and ventral surface wood-brown, the segments deeply impressed laterally, the base projecting also ventrally, the basal comb of ciliae being placed on a transverse rounded carina, the antenna appearing therefore subserrate in a lateral view.

Wings, *above*.——Forewing ecru-drab like the body, traversed by four brown lines, the first crossing M at base of M^2, slightly inclining costad, the second at that of M^1, straight, the third also straight to M^2, then curved distad, almost parallel to the second, 8 mm. from base of M^2, 3 mm. from lower angle of cell, fourth line a little nearer line 3 than outer margin, slightly curving basad from R^3 to internal margin, 3 mm. distant from line 3 at M^2 and $4\frac{1}{2}$ mm. from outer margin, while the distances are respectively 5 and 5 mm. at R^3, 5 and 8 mm. at SC^4; apex pointed, outer margin concave anteriorly, then convex, posteriorly straight, oblique, internal angle obtuse, internal margin shallowly sinuate distally.——Hindwing orange-rufous, a very narrow blackish brown border, the brown scaling extended along the veins, the border broader at and beyond M^2, here ecru-drab, as is the abdominal margin up to SM^2, a brownish black submarginal line between M^2 and SM^2, almost interrupted at (SM^1), the vestige of a second line proximally of the submarginal one, a short tooth at M^2 and SM^2.

Underside vinaceous-cinnamon, hindwing paler, both wings crossed by a discal and a postdiscal line; those of forewing slightly convex distally, being parallel to the outer margin (apical lobe of wing excluded) and to each other, outer line midway between outer margin and discal line, the latter $5\frac{1}{2}$ mm. from lower angle of cell at R^3. The discal line of hindwing distally concave in middle, being very feebly curved, crossing R^3 $1\frac{1}{2}$ mm. from cell, postdiscal line slightly convex distally in front, feebly concave posteriorly, standing at R^1 midway between outer margin and discal line, distance $4\frac{1}{2}$ mm.; at R^3 the distances are $3\frac{1}{2}$ and 4 mm. respectively, and at M^2 barely 3 mm.

The tenth tergite (Pl. XXV. f. 15, *Xt*) is rounded at the end, deeply concave beneath, somewhat curved downward and slightly dilated before the apex, a little spoon-shaped. The sternite (*Xs*) has a triangular, sharply pointed, mesial lobe. Clasper (Pl. XXXIII. f. 21) rounded at the end, both the dorsal and ventral edges oblique distally; the patch of friction-scales large, reaching to the apical and dorsal margins, which are fringed with very short white scales, the friction-scales very small, pointed, not close together, the area semi-transparent; harpe with two distal processes: the one ventral (*pv*), triangular; the other (*pm*) submesial, broad, inclining distad, sinuate, with the lobes rounded, the process proximally concave, covered with short bristles; this process *pm* stands in connection with a weak longitudinal fold which is clothed with dispersed long hairs and ends basidorsally in a spine-like process, which is much thinner than in *carteri*. Penis-funnel short, strong, ventrally and dorsally sinuate, the lobes consequently lateral, pointed; penis-sheath (Pl. XXX. f. 37) with an apical process which is more than three times as long as the sheath is broad.

♀. A very badly damaged ♀ in the Berlin Museum from Usaramo, German East Africa, may belong to this species. Antenna andromorphic; anal angle of hindwing less produced than in ♂, no lines on the underside of the wings, which are rubbed.

Early stages unknown.

Hab. East Africa: 1 ♂ (*type*) in the Tring Museum from Gowlu-pan, between Lialui and Kazungula, Upper Zambesi, second week of March, 1898 (Coryndon); 1 ♂ in coll. Chas. Oberthür from Mpala, Tanganyika; 1 ♀ (this species?) in the Berlin Museum from Usaramo, German East Africa (Stuhlmann).

214. **Polyptychus marshalli** spec. nov. (Pl. XIV. f. 14, ♂).

♂. Tongue short and weak. Joint of palpus open. Abdominal tergites spinose only at edges. Hindtibia tufted between the two pairs of unequal spinose spurs, longer terminal spur a little longer than the second tarsal segment. Antennal segments somewhat dilated dorso-laterally, ventral outline nearly straight (side-view). Clasper with very small patch of minute modified scales, no regularly-arranged friction-scales on innerside of eighth tergite.

Body and wings pale pinkish or vinaceous-buff, hindwing above more pinkish than forewing and body. End of palpus, crest of head, and anterior part of pronotum more or less brownish.

Wings, *upperside*.——Forewing, apex acute, but little projecting, hinder angle almost 90°, distal margin entire, hinder margin shallowly emarginate before angle; five vinaceous hazel lines, all straight, or very feebly undulate, the fifth somewhat curved behind R^3, lines 1 and 2 in basal half approaching each other a little behind: 1 at base of M^2, as far from base at costal as at inner margin; 2 near base of M^1; line 3 beyond cell, heavier than the others; 4 weak or obliterate; 5 weak but distinct, more or less accentuated by vein-dots; 3 to 5 nearly equidistant; a trace of a subbasal line at costal margin; fringe feebly darker at ends of veins; no subbasal dot.——Hindwing: apex broadly rounded, anal angle little projecting, fringe and anal area paler; traces of a median and of a postdiscal band.

Underside paler than upper.——Forewing with three feeble lines, situated between cell and distal margin, slightly and evenly curved.——Hindwing also with three extra-cellular lines, the first the heaviest, the second approaching the first behind, the third accentuated by vein-dots.

Structure of end of abdomen similar to that of *P. hollandi*, clasper slenderer, ventral lobe of harpe broader, broadly spoon-shaped, upper lobe shorter: penis-sheath without the long process found in *paupercula* and *hollandi*, the process indicated by a small lobe.

Length of forewing: 26—30 mm.

Hab. Salisbury, Mashonaland, October 1900 (Marshall), 1 ♂ (*type*) in the British Museum.

In the Tring Museum 1 ♂ without locality, figured to show the position of the lines.

215. **Polyptychus subjectus** (Pl. II. f. 15, ♂).

Saturnius subjectus Walker, *Proc. N. H. Soc. Glasgow* i. p. 328. n. 1 (1869) (Congo).
Polyptychus (?) *subjectus*, Butler, *Trans. Zool. Soc. Lond.* ix. p. 587. n. 4 (1877).
Maramba (?) *subjectus*, Kirby, *Cat. Lep. Het.* i. p. 708. n. 29 (1892).

♂. In pattern very close to *rosea*, *numosae*, etc. Not rosy red, but russet-fawn, slightly vinaceous or pinkish. Tongue, palpus, and spurs as in those species. Abdominal tergites spinose. Antenna as in *fulgurans*, rather shorter. Distal margin of forewing very faintly emarginate between the veins, D^2 of hindwing little longer than D^3 (only one specimen seen). Basal dot of forewing double, first ante-

median line evenly curved, first discal line quite straight, oblique, the other discal lines quite indistinct, apparently dentate as in *numosae*, the postdiscal line also indistinct, indicated by vein-dots, an ill-defined russet submarginal patch between SC^5 and M^1, a small patch of the same colour near hinder angle at inner margin; anal patch of hindwing narrower than in *numosae* and *rosea*.——*Underside*: discal line of forewing straight; hindwing with a denticulate postdiscal line, more or less double; discal line almost touching cell, more proximal behind and less curved than in *numosae*. Midtibia with white basal spot, hindtibia white above.

Tenth tergite closely resembling that of *coryndoni* (Pl. XXV. f. 15), being very dissimilar to that of *fulgurans* and *rosea*, flatter than in *coryndoni*, less curved downward, and wider before the end; the sternite also as in *coryndoni*, curved upwards. No friction-organ. Clasper short (Pl. XXXIV. f. 2) irregular in shape; a longitudinal fold dividing the inner surface into a dorsal and a ventral part; the harpe has a ventral ridge *pr*, which is denticulate and ends in a short hook (*prd*) partly concealed by the mesial fold. Penis-funnel (P-F) produced at each side side into a short, pointed lobe; penis-sheath (Pl. XXX. f. 29) with a ventral patch of teeth at the apex, the patch continued on to the inner side of the sheath.

♀. Not known.

Early stages not known.

Hab. Congo.

In the Tring Museum 1 ♂ labelled Congo 1868; it is doubtless the species intended by Walker's description, and may have come from the same collection; it had a gilded pin.

216. **Polyptychus fumosus** spec. nov. (Pl. II. f. 10, ♂).

♂. Similar to *subjectus* in pattern: forewing more grey, hindwing deeper brown. Apex of forewing produced into a lobe, distal margin slightly dentate, concave in front and behind, hinder angle projecting, first discal line more oblique than in *subjectus*.——Hindwing denticulate, fringe white-spotted below, with a brown-black anal mark which is thinner than above.

Tenth tergite very broad, rounded, entire; sternite with a narrow, compressed, pointed, mesial process, which is slightly curved upwards. Clasper short, irregular in shape; middle part deeply concave, with a hairy ventro-dorsal fold, the cavity partly covered by a dorsal fold and the projecting edge of the non-concave apical part of the clasper; harpe ending in a curved hook which is preceded by a triangular tooth. Penis-funnel produced at each side into a long process; penis-sheath with a multidentate process at the edge curving inside.

♀ and early stages not known.

Hab. East Africa: Dar-es-Salaam.

One ♂ in coll. Druce.

217. **Polyptychus fulgurans** spec. nov. (Pl. II. f. 14, ♂).

♂. Tongue short and weak. Joint of palpus open. D^2 of hindwing a little longer than D^3, curved; lower angle of cell acute. Body greyish, mixed with chestnut; sides of frons, middle of occiput and of pronotum, metanotum and base of abdomen, palpus and breast, chestnut; mesothoracic tegula more grey; edges of abdominal segments thinly white. Antenna deeply grooved, segments ventrally less sinuate than in *rosea*, and, in a ventral view, not so thin in the middle. Spurs

of mid- and hindtibiae with few spines, the long terminal one more than half the length of the first tarsal segment. Abdominal tergites with spines all over.

Wings, *above*.——Forewing greyish pink, slightly darker in outer area; outer margin straight; two black dots near base, with an indistinct line proximally of them; a straight line just proximally of base of M^2, at right angles to hindmargin, very faintly bent costad in front, a double line proximally of base of M^1, less heavy, consisting of three sections, costal section down to M straight, second section between M and SM^2 slightly concave, third section straight and oblique, leaning basad posteriorly; a double line at D, stopping at R^3; a well-marked discal line crossing SC^5 1½ mm. and M^2 6½ mm. from the bases of these veins, gently curved twice, being feebly convex between C and R^3 and then faintly concave; close upon the discal line (and parallel with it) follow two thin lines of which the second is barely traceable, then follow two undulate lines, parallel to one another, distance between them about 3 mm., the outer one reaching internal margin 5 mm. from angle of wing; outside this line there is a short heavy bar between M^2 and internal margin, subdivided at SM^2; the lines pinkish chestnut.——Hindwing: base and abdominal area red, this colour gradually shading into the pinkish hazel colour of the distal half; a discal line crossing R^3 2 mm. from the cell, convex in front, slightly concave behind, hazel colour; a chestnut bar of 1 mm. breadth at anal angle between M^2 and edge of wing, at the proximal side of which bar stands a thin line; D^2 not much longer than D^3.

Underside.——Forewing: basal half pale pink, outer half ochraceous-buff, with numerous tawny scales; three lines in outer half, more distinct in front, very feebly marked behind, all curving slightly costad, the first crossing R^3 3 mm. from cell, the second 4½ mm. more distal, the third 2⅓ mm. more distal than the second at R^3.——Hindwing, pinkish ochraceous-buff, sprinkled over with tawny scales, basal half more grey; three lines in outer half, convex in front, slightly concave behind, nearly equidistant, approaching one another a little behind, the discal line crossing R^3 barely 1⅔ mm. from cell, third line undulate between R^3 and M^2, 2⅓ mm. from outer margin at R^3; traces of a fourth line between M^1 and abdominal margin, space between this line and margin up to M^2 filled up with pinkish vinaceous-rufous scaling.

Tenth tergite (Pl. XXVI. f. 36) somewhat pear-shaped, rather abruptly narrowed to a blunt, slightly curved hook: the greater part of the plate—the sides and the hook excepted—membranaceous; the sternite very narrow and long, deeply cleft, the two lobes somewhat compressed and sharply pointed. Clasper with a naked area occupying the greater part of the outside, this space with minute granules; apex rounded, ventrally more oblique than dorsally; harpe (Pl. XXXIII. f. 17) very simple, the armature represented by a heavy basi-ventral dilatation of the clasper (*pr*), the projection triangular, irregularly rounded and somewhat notched. Penis-sheath without external armature, but there are two flaps inside which have serrated edges.

♀ and early stages not known.

Hab. Kiokwe, British East Africa.

One ♂ in the Tring Museum (*type*).

This is possibly the ♂ of *numosa*, but the differences are such that we must consider them of specific value. The differences in colour between the species of this genus are sometimes very slight: compare *assimilis* and *pygarga*, *andosa* and *compar* and *consimilis*; *hollandi* and *paupercula*.

218. Polyptychus numosae.

**Smerinthus numosae* Wallengren, *Wien. Ent. Mon.* iv. p. 42. n. 40 (1860) (♀, Caffraria ;—Mus. Stockholm).
Smerinthus mimosae id., *Kongl. Sc. Vet. Ak. Handl.* (2). v. 1. p. 20 (1865).
Polyptychus numosae, Butler, *Trans. Zool. Soc. Lond.* ix. p. 584. n. 3 (1877) (Caffraria) ; Kirby, *Cat. Lep. Het.* i. p. 706. n. 4 (1892).
**Triptogon cytis* Druce, *Ent. Mo. Mag.* xix. p. 18 (1882) (Vaal R., ♀ ;—coll. Druce).
Marumba cytis, Kirby, *l.c.* p. 708. n. 32 (1892).
**Polyptychus consanguineus* Distant, *Ann. Mag. N. H.* (7). iii. p. 179 (1899) (♀, Lydenburg, Transvaal ;—coll. Distant) ; id., *Ins. Transv.* t. 3. f. 3 (♀) (1902).

♀. Paler than *fulgurans*, the lines in the basal half of the forewing above barely vestigial, first discal line very oblique, almost evenly curved from costal to internal margin ; middle line of hindwing more proximal. Antenna grooved, with prolonged ciliae. SC^2 and R^1 of hindwing on a rather long stalk, D^3 longer than D^4. The type of *cytis* is more pinkish than that of *numosae*, the forewing is narrower, the blackish brown anal mark of the hindwing is much narrower, the first line of the hindwing is a little more distal, standing beyond the cell below, while it crosses the apex of the cell in *numosae*, and the double row of postdiscal dots of *numosae* is replaced by a single faint line. Vaginal plate partly visible in both type-specimens ; ridge in front of orifice slightly sinuate, without processes, postvaginal part of plate mesially impressed longitudinally, broadly triangular.

♂ and early stages not known.

Hab. S.E. Africa : Caffraria and Transvaal.

Only 3 ♀♀ known as yet.

219. Polyptychus rosea.

**Triptogon rosea* Druce, *Ent. Mo. Mag.* xix. p. 17. (1882) (Cameroons, ♀ ;—coll. Druce) ; id., in Moloney, *West Afr. Forestry* p. 493. n. 11 (1887).
**Triptogon reducta* Karsch, *Ent. Nachr.* xvii. p. 13. t. 1. f. 2 (1891) (Togo, ♂ ;—Mus. Berlin).
Marumba reducta, Kirby, *Cat. Lep Het.* i. p. 708. n. 30 (1892).
Marumba rosea, id., *l.c.* n. 31 (1892).

♂♀. Tongue short and weak. Joint of palpus open. Antenna strongly ciliated in both sexes, distinctly grooved in ♀, the segments ventrally more or less sinuate in side-view in ♂. Spurs spinose, longer terminal one of hindtibia at least half the length of the first tarsal segment, and twice as long as the shorter spur. Abdominal tergites spinose, rather densely so on the back. Distal margin of forewing very slightly dentate, convex in ♀, almost straight in ♂, apex slightly produced, inner margin feebly emarginate distally, the angle distinct, more than 90° ; D^2 of hindwing curved, not twice as long as D^3, lower angle of cell acute. Clasper and eighth tergite with organ of friction.

Similar to *numosae* and *fulgurans*, antennae more deeply grooved in both sexes, longer in ♂, ventral line uneven (in side-view), hindwing shorter costally, forewing with a single basal dot, first antemedian line evenly curved from costal to inner margins, postdiscal line somewhat convex between R^2 and M^2, more so in ♀ than in ♂, entire ; anal patch of hindwing larger, closer to the margin. Midtibia with an indistinct pale basal spot, hindtibia pale above, but not white. Sexual armature quite different from that of *fulgurans*.

♂. Tenth tergite (Pl. XXV. f. 16) very slender, narrowed to a point, curved downwards, forming a short hook ; the sternite longer than broad, subtriangular, with the sides gently rounded and the apex incised. Clasper reduced in size, with

a patch of modified friction-scales ; these large, elongate-ovate, pointed, mesially carinate ; a single row of friction-scales at the internal edge of the eighth tergite ; harpe (Pl. XXXIV. f. 1) with a short but strong ventral hook (*prd*), which stands in connection with a dorsal process (*pd*) ; this process somewhat club-shaped, beset with tubercles ; it corresponds to the dorso-basal process found in the species of *Clanis*. Penis-sheath (Pl. XXX. f. 28) armed before the end with a single strong tooth which projects laterad as in *P. virescens*, but is much shorter.

♀. Vaginal armature (Pl. XVII. f. 18) not strongly chitinised, no processes, two transverse folds before the orifice, postvaginal plate (*pvp*) mesially concave, rounded-triangular.

Early stages not known.

Hab. West Africa : Sierra Leone to Cameroons, probably farther south.

In the Tring Museum 3 ♂♂, 1 ♀ from : Sierra Leone ; Cape Coast Castle, Gold Coast : Warri, Niger Coast, June 1896 (Dr. Roth).

The width of the interspace between the antemedian and the discal lines is not quite constant.

220. **Polyptychus foliaceus** spec. nov.

♀. Tongue extremely short. Antenna with very slightly prolonged seriated ciliae. Joint of palpus open. Spurs very short, not spinose. Distal margin of forewing entire, convex, hinder angle obtusely rounded, not projecting anad, inner margin very shallowly sinuate distally ; lower angle of cell of hindwing almost 90°.

Body and wings pinkish clay-colour.——*Upperside* of forewing darker than hindwing, no basal spot : a blackish or brown line across apex of cell continued as a feeble shadow towards inner margin, which it reaches before hinder angle, here a little more accentuated than on the disc ; another feeble line midway between cell and tip of wing from costa to R^1, meeting at this vein an oblique apical line, equally feeble, these two lines limiting a triangular costal area which is slightly darker than the disc; fringe brown.——Hindwing paler towards base and abdominal margin, distal margin slightly dentate at SM^2, a brown marginal shade at anal angle.

Underside.——Forewing paler than above : basal half with a slight yellowish tint ; an oblique, feeble, subapical line reaching costal margin before the tip of the wing and bordering a greyish space.——Hindwing : two feeble discal lines, the proximal one straight, crossing R^3 2½ mm. from cell, external one curved like the outer margin.

Not dissected.

Early stages and ♂ not known.

Length of forewing : ♀, 32—35 mm.

Hab. Misahöhe, Togo, 31. iii. 1894, 1 ♀ (*type*), two others from the same place, April (E. Baumann) ; Kete Kratje, W. Africa (Zeck) : all in the Berlin Museum.

According to Baumann (on the label) not rare in the forest near Agowe, but very shy. It is generally found sitting on the fallen-off calyces of *Musanga smithi*.

221. **Polyptychus contraria** (Pl. I. f. 10. 11, ♂♂).

*♂. *Ambrisa contraria* Walker, *List Lep. Het. B. M.* vii. p. 1735. n. 1 (1856) (Natal ;—Mus. Brit.).
*♀. *Basiana submarginalis* id., *l.c.* xxxi. p. 37 (1864) (S. Leone ;—Mus. Brit.).

♂♀. An individually and sexually variable insect, of which the West African form has received no less than five names.

Tongue very short. Palpus smooth-scaled, the scales erect; joint open. Antenna of ♂ rather strongly grooved, side-line undulate in a dorsal view, ventral line of each segment (in side-view) straight, the apical sensory cone prominent, the ventral parts of the segments not touching one another; in ♀ rounded-triangular in transsection, very feebly grooved, but the segments somewhat constricted at the joints, the basal and dorsal fasciculated ciliae somewhat prolonged, the longest of about the same length as the segment, the fascicles not close together. Spurs spinose, the long terminal one of the hindtibia about two-fifths the length of the first tarsal segment; hindtibia as long as tarsal segments 1 and 2 together. Body woolly, scarcely with any short broad scales; abdominal tergites with long weak spines all over, the spines dense at the edges. Distal margin of wings entire, of forewing straight or convex, sexes different, ♂ with apex of forewing very little or not produced, ♀ with the apex almost hooked, hinder margin straight or nearly straight; hindwing very strongly rounded, more so in ♂ than in ♀; D^2 very oblique, more than twice the length of D^3. No organ of friction on the clasper and the eighth tergite.

Both sexes vary in the ground-colour and in the distinctness of the markings; sometimes there are scarcely any markings at all. The stigma of the forewing is often very conspicuous; sometimes it is represented by a ring, and is also often wanting. Some individuals have a brown cloud along the abdominal margin of the hindwing, this cloud corresponding to the black patch found in *nigriplaga*.

♂. Eighth tergite slightly but distinctly sinuate in the middle (best visible from the underside after the claspers have been taken out). Tenth tergite very short, triangular, gradually narrowing to the blunt apex, longitudinally impressed; the sternite rather broad, curved dorsad, apically pointed or rounded, sides slightly angled and bent ventrad, hence the under surface of the plate concave. Clasper (Pl. XXXIV. f. 3) very much reduced in size, covered with very long narrow scales; it is apically narrowed to a ladle-like process, from the cavity of which projects a sharp hook of the harpe (*prd*); the harpe occupies the whole cavity of the clasper, and is dorsally divided into two folds (*m* and *n*). Penis-sheath without armature, very short, apically flattened, prolonged into a triangular blade.

♀. Eighth abdominal tergite membranaceous, feebly incrassate at the edge. Vaginal plate (Pl. XVII. f. 13) with a transverse smooth fold which is widened mesially and bears here a more or less triangular lobe; postvaginal plate membranaceous, scaled, excepting middle.

Early stages not known.

Hab. Continental Africa, from Natal to British East Africa and Senegambia, probably all over the Aethiopian region exclusive of Madagascar and the neighbouring islands.

Two subspecies, which are structurally alike.

a. P. contraria contraria (Pl. I. f. 10. 11, ♂♂).

**Andriasa contraria* Walker, *l.c.* (Natal); Kirby, *Cat. Lep. Het.* i. p. 714. n. 1 (1892).

♂. Distal margin of forewing convex. The discal line of the underside of the hindwing as a rule close to cell, straight, occasionally some mm. distant from cell and curved. Distinctness of the lines very variable. The submarginal vein-dots of the hindwing sometimes transverse, occasionally situated in an obscure line.

♀. Apex of forewing more or less produced. Colour and pattern variable as in ♂.

Hab. Natal to British East Africa.

In the Tring Museum 2 ♀♀ from Dar-es-Salaam, and a series of 26 ♂♂, 17 ♀♀ found by W. Doherty at the Kikuyu Escarpment, east of the Ravine, British E. Africa, mostly in February and March at an elevation from 6500 to 8000 ft.

b. P. contraria submarginalis.

*♀. *Basiana submarginalis* Walker, *l.c.* xxxi. p. 37 (1864) (Sierra Leone ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 49. n. 3 (1875).
♀. *Basiana suffusa* Walker, *Proc. Nat. Hist. Soc. Glasgow* i. p. 329. n. 3 (1869) (Congo).
*♀. *Smerinthus adansoniae* Boisduval, *l.c.* p. 27. n. 15 (1875) (Senegal ;—coll. Oberthür).
♀. *Pseudosmerinthus submarginalis*, Butler, *Trans. Zool. Soc. Lond.* ix. p. 593. n. 1 (1877) ; Kirby, *l.c.* p. 703. n. 1 (1892).
♀. *Pseudosmerinthus suffusa*, Butler, *l.c.* n. 2 (1877) ; Kirby, *l.c.* n. 5 (1892).
*♀. *Smerinthus pechueli* Dewitz, *Mitth. Münch. Ent. Ver.* iii. p. 28. t. 1. f. 4 (1879) (Chinchoxo ;—Mus. Berlin).
?♂. *Pseudosmerinthus marginalis* (!), Butler, *Ann. Mag. N. H.* (5). x. p. 435. sub n. 8 (1882) (laps. cal.).
*♂. *Dewitzia perpallida* Holland, *Ent. News* iv. p. 341. n. 8. t. 15. f. 5 (1893) (Benita ;—coll. Holland).
♀. *Pseudosmerinthus pechueli*, Kirby, *l.c.* p. 703. n. 2 (1892).
♂. *Pseudosmerinthus perpallida*, id., Nov. Zool. i. p. 103 (1894).

♂. Distal margin of forewing straight. Discal line of hindwing below curved, about 2 mm. distant from cell at R^3.

♀. Discal line of hindwing as in ♂. We have seen four specimens ; there does not seem to be a constant difference between these ♀♀ and the East African ones, as the position of the discal line of the hindwing is variable in the Eastern individuals (see above). A longer series of East and West African specimens must be compared side by side in order to find out the difference, if there is one.

Hab. West Africa : from the Congo Region to the Senegal.

In the Tring Museum 3 ♂♂, 1 ♀ from : Anambara Creek, Niger ; Warri, Niger, July and September, 1897 (Dr. Roth) ; Yakusu, Upper Congo, July 1900 (K. Smith).

One of our ♂♂ is very pale, having lost nearly all the markings.

Butler, *l.c.*, mentions a "♂" as *marginalis* ; as there is no ♂ in the British Museum, he meant perhaps another species.

222. **Polyptychus nigriplaga** spec. nov. (Pl. V. f. 4, ♂).

♂. Tongue short and weak. Palpus smooth-scaled, joint open, third segment rather prominent. Antennal segments with straight ventral outline (side-view), penultimate segment longer than high. Abdominal tergites with yellowish spines all over, the spines denser at the edges. Spurs not spinose, short, longer terminal one of hindtibia about one-third the length of the first tarsal segment. Distal margin of forewing straight, oblique, entire, hinder margin sinuate before angle, apex barely produced ; D^2 of hindwing thrice as long as D^3, both oblique, lower angle of cell acute. Clasper with naked space, friction-scales of eighth tergite small, numerous, irregularly placed.

Body and wings clayish cream-colour. Sides of palpi, a middle streak on

head and thorax, a spot at the base of the eighth tergite, and the underside of the tibiae and tarsi, brown.

Wings, *upperside*.——Forewing : a rather large, rounded, basal spot dark brown, two antemedian lines, undulate, not very distinct, behind more distal than in front, the second almost a mere transverse cloud ; a pale brown annulus upon cross-veins, with pale centre ; a dark costal cloud beyond apex of cell, continued by some faint lines which are scarcely traceable between R^1 and R^3, but become more obvious at inner margin ; between this cloud and the apex of the wing there are two spots, the second more distinct ; each forms the costal spot of a series of vein-dots which is somewhat curved in front, the inner series ending in an angulated line ; fringe brown, not spotted.——Hindwing : produced at SM^2, darker than forewing, somewhat pinkish, basal area and abdominal and distal margins paler than disc, a brownish black elongate patch along SM^2 midway between base and distal margin ; the dark brown postdiscal shade ending in two brown subanal spots which are connected with one another by a line ; fringe pale, with dark vein-dots.

Underside clayish cream-colour, slightly pinkish, dusted with black scales, excepting basal area of forewing.——Forewing : distal area greyish, with two rows of vein-dots in outer half of disc, the anterior dots of the inner row connected by a zigzag line ; proximally of these two series there are traces of some more lines in the costal region.——Hindwing : an indistinct discal line, touching apex of cell, curved ; two rows of dots nearer margin, the inner dots more or less connected by a line.

Tenth tergite broad (Pl. XXV. f. 20), suddenly narrowed to a sharply pointed hook ; the sternite (*Xe*) divided into two lobes, each pointed, horizontal, the broader side vertical, ventral edge fold-like and clothed with hairs. Clasper (Pl. XXXIV. f. 5) widest in middle, narrowed from middle to end ; a naked dorsal space on outerside where the clasper is widest ; harpe consisting of a long ridge which reaches almost the end of the clasper ; it is raised distally into a higher denticulate ridge, which bears on the ventral side a thorn-like tooth. Penis-sheath (Pl. XXX. f. 40) ending in a long process which is somewhat widened at the end, and is armed here with a minute tooth.

Length of forewing : 32 mm.

♀ and early stages not known.

Hab. West Africa : Cameroons and Congo.

In the Berlin Museum several specimens from Lolodorf, Cameroons (L. Conradt), one of them, caught on the 10th of July, given to the Tring Museum in exchange, *type*. Also a specimen in the Musée Royal at Bruxelles from Beni Bendi, Sankuru, Jan. 1895 (L. Cloetens), and in coll. Charles Oberthür from Johann Albrechts Höhe, Cameroons (L. Conradt).

223. **Polyptychus paupercula** (Pl. V. f. 1, ♂ ; 2, ♀).

**Dewitzia paupercula* Holland, *Trans. Amer. Ent. Soc.* xvi. p. 65. n. 22. t. 4. f. 1 (1889) (Kangwé ;— coll. Holland).

Pseudosmerinthus paupercula, Kirby, *Cat. Lep. Het.* i. p. 703. n. 3 (1892).

Dewitzia (!) *paupercula* Holland, *Ent. News* iv. p. 341. sub n. 8 (1893).

♂ ♀. Tongue very short and weak. Joint of palpus open. Antennal segments with straight ventral outline (side-view) ; not much compressed in ♀, with the seriated ciliae rather dense and not much prolonged. Spurs not spinose, long one

of hindtibia less than half the length of the first tarsal segment. Distal margin of forewing almost straight in ♂ ; bisinuate in ♀, with a prominent lobe at R^2, hinder angle a little projecting backwards. D^2 of hindwing twice as long as D^3, very oblique. Abdominal tergites not spinose excepting edges, underscales large. Clasper and eighth tergite with organ of friction.

There are two species known to us, which are almost exactly the same in pattern; they can be distinguished, apart from structure, by the one species having upon M^2 of the forewing in front of the tawny spot standing at inner margin close to angle one larger black dot accompanied at the proximal side by the vestige of a second dot, while the other species has two small black dots of equal size instead (Pl. LXV. f. 17. 18). The former insect is *paupercula*, the type of which is an abnormally large individual.

♂. The tenth tergite is very slender and long, curved downwards, not acutely pointed (Pl. XXV. f. 18, side-view) ; the sternite has a large lobe, which is somewhat dilated laterally, rounded, slightly sinuate mesially (Pl. XXV. f. 17. *Vr*, dorsal view). Clasper elongate, dorsal margin slightly concave, convex before end, apex rounded, ventral margin slightly convex ; the patch of friction-scales subapical, ovate, the scales narrow, pointed, conspicuously different from the other scales of the clasper not only in structure but also in colour, being buffish, not greyish white ; eighth tergite with a belt of friction-scales at the internal edge, the scales not very large, but regular in position ; harpe (Pl. XXXIII. f. 24) a broad rounded flap, concave, dorsal part rough with short spines, sometimes more truncate than in figure. Penis-sheath with a long apical process curved proximad, the process stout, conical (Pl. XXX. f. 42).

♀. Vaginal plate (Pl. XVII. f. 17) raised to a rather high ridge before the orifice (*v*), this ridge (*avp*) broadly and shallowly sinuate, without processes ; postvaginal part of plate (*pvp*) membranaceous, short.

Early stages not known.

Hab. West Africa : Niger to Congo ; probably of wider distribution.

In the Tring Museum 17 ♂♂, 2 ♀♀ from : Warri, Niger, February to September (Dr. Roth) ; Akassa to Onitscha, Niger (Dr. Cook) ; Agberi, Niger, September (Dr. Ansorge) ; Yaknsu, Upper Congo, August 1900 (K. Smith).

The ♀ figured is in the Stockholm Museum, from the Cameroons.

224. **Polyptychus hollandi** spec. nov. (Pl. V. f. 3, ♂).

♂. Very close to *paupercula*, deeper brown. Markings of wings as in *paupercula* ; but the tawny spot at the inner margin near angle smaller not reaching vein M^2, and there are two minute black dots in front of it upon M^2, the external one of them not being larger than the dots upon M^1 (Pl. LXV. f. 17). Marginal area of hindwing as far as the series of dots rather darker in tint than the disc in *paupercula*, while the disc is as dark as the marginal area in *hollandi*. The tenth tergite is carinate above, hence broader in side-view (Pl. XXV. f. 19) ; the harpe is deeply sinuate (Pl. XXXIII. f. 25), and the hook of the penis-sheath (Pl. XXX. f. 43) is slenderer than in *paupercula*.

♀. Not known.

Hab. West Africa.

In the Tring Museum 2 ♂♂ from Warri, Niger Coast, June 1897 (Dr. Roth) ; third ♂ in coll. Holland from Bule country, W. Africa (Good).

225. Polyptychus mutata.

**Lymantria? mutata* Walker, *List Lep. Het. B. M.* iv. p. 873. n. 5 (1855) (Natal, "♀" ex err.;—Mus. Brit.).
**Andriasa erubescens* id., *Trans. Ent. Soc. Lond.* (3). i. p. 263 (1862) (Natal;—Mus. Oxford); Kirby, *Cat. Lep. Het.* i. p. 714. n. 4 (1892).
Andriasa mutata, id., *l.c.* p. 714. n. 3 (1892).

♂. Head with mesial crest. Tongue reduced to two weak lobes which are shorter than the first segment of the palpus. Joint of palpus open; third segment rather prominent. Antennal segments of ♂ deeply grooved, subpectinate, the upper edge of each groove being produced laterad into a short broad lobe (Pl. LXI. f. 1. 2); the long ciliae fasciculated, the fascicles not numerous, placed upon tubercles, an isolated subdorsal fascicle between middle of segment and apical edge; the distal segments separated ventrally, the penultimate one much higher than long, its proximal edge oblique, with the angle rounded (side-view); end-segment with a submesial median spine (ventrally often broken off). Spurs of foretibia almost reaching end of tibia; spurs of mid- and hindtibiae not spinose, longer terminal one of hindtibia about one-third the length of the first tarsal segment; hindtibia as long as tarsal segments 1 and 2 together. Abdominal tergites spinose only at the edges, underscales large. Apex of forewing not produced, distal margin convex, hinder angle very obtuse, hinder margin almost straight; anal angle of hindwing not distinctly produced, D^2 curved, not essentially longer than D^3. Clasper without friction-patch.

Tenth tergite short and broad, slightly curved downward, narrowed to the apex, but not pointed, mesially sinuate; sternite evenly and broadly sinuate, the lobes broader than long, halfmoon-shaped. Clasper longer than broad, rounded at apex, dorsal edge nearly straight, horizontal, ventral edge rounded in basal third, then straight, obliquely ascending; no harpe, but there is a dorso-basal process which is homologous and similar to that of *Clanis bilineata*, rough with tubercles at the end. Penis-sheath without armature, a feeble carina at the end.

♀ and early stages not known.

Hab. Natal.

In the Tring Museum 18 ♂♂ from Natal.

226. Polyptychus meander.

Gynocryx meander Guenée, in Vins., *Voy. Mad.* p. 30 (1865) (nom. nud.).
**Smerinthus meander* Boisduval, *l.c.* p. 22. n. 8 (1875) (Madagascar, ♀;—coll. Oberthür); Mab., *Ann. Soc. Ent. France* p. 293 (1879) (Madagascar).
Metamimas meander, Butler, *Trans. Zool. Soc. Lond.* ix. p. 628 (1877).
Triptogon meander, id., *Cist. Ent.* ii. p. 393 (1879) (Antananarivo, ♂); Saalm., *Lep. Mad.* p. 126. n. 298 (1884) (Nossi-bé).
Smerinthus meander (?), id., *Ber. Senk. Naturf. Ges.* 1877-78. p. 90. n. 60 (1878) (descript. of ♂♀, Loucoubé).
Ambulyx (?) *meander*, Kirby, *l.c.* p. 677. n. 47 (1892).

♂♀. Tongue very short and weak. Palpi somewhat divergent; joint open. Antenna of ♀ sub-andromorphic; of ♂ with long fasciculated ciliae, ventral outline of segments very faintly concave. Abdomen with long spines all over the tergites, the spines dense at the apical margins. Distal margin of forewing somewhat dentate or undulate, convex, apex not distinctly produced; apex of hindwing strongly rounded, D^2 shorter than D^3, both straight, oblique, D^3 as long as upper

section of M. Spurs short, not spinose, two pairs to hindtibia, longer apical one little longer than the tibia is broad. No organ of friction.

The species bears in pattern an extraordinary likeness to the species of *Marumba*; it is in fact a *Marumba* with two pair of spurs to the hindtibia and less specialised clasper, constituting a type similar in this respect to the ancestor of *Marumba*.

♂. Tenth tergite broad, sides nearly parallel, apex narrowed, deeply sinuate, lobes pointed, their mesial edges bent downward, carinate below; sternite represented by a mere rounded fold. Clasper long-scaled outwardly, especially at apical and dorsal edges, short, broad, deeply concave, with a prominent dorsal fold; harpe very stout, obtuse at end, upperside concave, finely setose, the ventral edge cariniform, dorsal edge with rather heavy spines. Penis-sheath and -funnel without external armature.

♀. Not dissected.

Early stages not known.

In Boisduval's type, which is a large ♀, the forewing is less rounded than in the other specimens we have seen, and the hindwing is more brownish yellow.

Hab. Madagascar: Nossi-bé; Tamatave; Imerina.

In several collections. In the Tring Museum 1 ♂ from Tamatave, received through the kindness of Mons. Charles Oberthür.

LXI. PHYLLOXIPHIA gen. nov.—Typus: *oberthueri*.

♂. Close to *Polyptychus*. Tongue reaching to the end of the midcoxa, weak. Second segment of palpus thrice as long as first, joint *not* open. A large tuft of scale-hairs ventrally behind eye, covering lower part of same. Antenna rather thin, ventral outline (side-view) of segments straight, apical segment three times as long as high, penultimate one distinctly longer than high. Abdomen long, tergites with broad underscales, spinose only at edges. Spurs not spinose, short, longer terminal one of hindtibia about twice as long as the tibia is broad; the tibia little longer than the first tarsal segment.——Forewing: apex strongly produced, acute, hooked, distal and inner margins evenly rounded from SC^5 to base, no angle.——Hindwing: apex obtusely pointed, anal angle not produced, obtusely rounded, D^2 more than twice the length of D^3, very oblique, D^3 transverse, lower angle of cell obtuse.

♀ and early stages unknown.

Hab. West Africa.

One species.

227. **Phylloxiphia oberthueri** spec. nov. (Pl. I. f. 4, ♂).

♂. Head and thorax above, sides of palpi and dorsal part of the abdominal tergites clayish olive, this colour gradually fading away on the last segments, rather sharply limited laterally on the basal ones; rest of body cream-colour, underside of legs and the anterior coxae rather darker.

Wings, *above*, a little paler than the thorax.——Forewing washed with cinnamon; there are *feeble* traces of lines: one line subbasal, beginning at M proximally of M^2, and ending more distally at inner margin; two between M^1 and R^3, and traces of a third beyond end of cell, these three parallel, posteriorly more

distal than anteriorly ; two undulate lines from costal to inner margin, beginning between cell and SC^5 ; all these very indistinct ; a more distinct, even, line from tip of wing to lower angle of cell continued along M to near base ; the line is thin and has a pale hinder border, recalling the midrib of a leaf ; the veins are faintly streaked and bordered pale ; disc behind apex of cell more cinnamon ; stigma black, small but conspicuous ; inner margin with a darker basal triangular space.—— Hindwing of the dark colour of the thorax, costal and abdominal margins and upper part of distal margin cream-colour.

Underside dirty cream-colour.——Forewing : middle of basal half fuscous ; a line from apex to R^3, which it reaches 6 mm. from cell, thence continued posticad to M^2, which it reaches 6 mm. from end, forming a very obtuse angle at R^3.—— Hindwing : abdominal area shaded with fuscous : a faint trace of a discal transverse line, and a thin oblique apical line.

Tenth tergite long (Pl. XXV. f. 25, *Xt*) divided into two lobes ; the sternite (*Xv*) broadened apically, divided into two diverging lobes. Clasper (Pl. XXXIV. f. 12) narrowed towards end, much more elongate triangular than in the species of *Polyptychus*, with long narrow scales at the apex ; no friction-patch (the clasper is much rubbed, like the eighth tergite, in the only specimen known to us) ; there is no projecting harpe. Above the penis-funnel there is a pair of curved processes (*n*) which bear setiferous tubercles. Penis-sheath without external armature, but from the interior projects a double blade of chitin, notched, and beset with some bristles (Pl. XXXIV. f. 12).

♀ and early stages not known.

Hab. Lolodorf, Cameroons (L. Conradt).

One ♂ in coll. Charles Oberthür.

LXII. LYCOSPHINGIA gen. nov.—Typus : *hamatus*.

Smerinthus, Dewitz (*non* Latreille, 1802), *Mitth. Münch. Ent. Ver.* iii. p. 28 (1879).
Polyptychus, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 705 (1892).

♂. Tongue very short and weak. Genal process small. Palpus smoothly scaled, joint not quite open. Antenna (♂) thickest in basal fifth, distal segments scarcely grooved, ventral outline of segments (side-view) straight, penultimate segment longer than high, last one three times as long as high. Abdomen long, tergites without spines at the edges, the scales representing them bi- or tridentate, rather tawny. Spurs short, not spinose, *one* pair to hindtibia, longer spur as long as the tibia is broad ; pulvillus and paronychium present. Clasper without friction-patch, but eighth tergite internally with small erect scales at the inner edge. Apex of forewing very strongly produced, hooked, apex of hindwing pointed at SC^2, anal angle produced, distal margin concave between R^1 and anal angle, D^2 more than twice as long as D^3, not strongly oblique, D^3 transverse, lower angle of cell *obtuse*.

♀ and early stages not known.

Hab. West Africa : Angola to Gold Coast.

Differs from *Polyptychus* in the hindtibia having only one pair of spurs ; from *Marumba* in the obtuse lower angle of the cell of the hindwing, from *Laothonia* in the presence of the paronychium. Wing-form peculiar.

228. **Lycosphingia hamatus.**

**Smerinthus hamatus* Dewitz, *l.c.* p. 28. t. 2. f. 2 (1879 (♂, Chinchoxo ;—Mus. Berlin).
Polyptychus hamatus, Kirby, *l.c.* n. 1 (1892).

♂. We have seen only two specimens. The antennae are rather too short in Dewitz's figure, and the (visible) end-segment of the abdomen is too broad ; this eighth tergite is rather long, and its ventral edge broadly sinuate. Tenth tergite broad, triangular, obtuse ; sternite elongate-triangular, apex obtuse and incrassate, being convex beneath. Clasper (Pl. XXXIII. f. 16) broad, dorsal margin with a process (broken in the specimen dissected) ; harpe a large concave plate, narrowed at end, strongly rounded ventro-basally, apex obtuse and beset with short spines at the edge. Penis-sheath with long club-shaped process (Pl. XXX. f. 26), which ends in a small point.

Hab. West Africa.

One ♂ in the Berlin Museum (*type*) from Chinchoxo ; Gold Coast, 1 ♂ in Mus. Tring, received in exchange from G. Weymer.

LXIII. LIKOMA gen. nov.—Typus : *apicalis.*

♂ ♀. Differs from *Polyptychus* in having only *one* pair of spurs to the hindtibia, and in the *absence* of the paronychium.

Tongue very short and weak. Joint of palpus open. Ventral outline of antennal segments slightly concave (side-view). Scales of abdominal tergites narrow, many hair-like ; spines at the apices numerous but weak. Spurs very short, not spinose, longer one of hindtibia scarcely longer than the tibia is broad. Pulvillus present, paronychium absent, *i.e.* without lobes. Distal margin of forewing dentate ; D^2 of hindwing curved, oblique, not longer than D^3, this very oblique, lower angle of cell sharply acuminate. Clasper and eighth tergite with organ of friction.

Early stages not known.

Hab. East Africa.

One species.

229. **Likoma apicalis** spec. nov. (Pl. V. f. 5,♂).

♂ ♀. Body and wings dirty vinaceous, shaded with chocolate-brown scaling ; metanotum and base of abdomen above much darker.

Wings, *upperside.*——Forewing with blackish brown lines with pale borders, which make the line appear double : two almost straight, in basal half, the one about 2 mm. proximally of base of M^2, the other at base of M^1 ; two on disc, the first straight, the second concave from costal margin beyond R^3, then turning basad and curving towards hinder margin ; a postdiscal line curved in nearly the same way, indistinct behind ; the marginal area bordered by the postdiscal line and an obliquely placed double spot at angle dark chestnut ; stigma small, white ; fringe whitish between veins.——Hindwing with three lines : proximal one just distal of base of M^1, nearly quite straight, the second somewhat curved in middle, nearer the first behind than in front, both with pale outer border, the third less distinct, nearly parallel to margin, also with pale border ; the marginal area limited by this

pale line deeper in tint, changing into chestnut between M^1 and anal angle ; distal margin slightly undulate.

Underside.——Forewing more pinkish in basal half, without antemedian lines ; a curved discal line, nearly 7 mm. from stigma ; a band of three postdiscal and submarginal lines with pale borders, the band curving distad between R^3 and (SM^1), concave between SC^5 and R^3 ; marginal area chestnut as above, but more distinctly extended to hinder angle.——Hindwing : lines as above, discal one more curved behind ; marginal area chestnut between M^2 and anal angle.

♂. Tenth tergite strongly narrowed towards end (Pl. XXV. f. 26), apex feebly sinuate ; sternite narrowed suddenly to a pointed process. Clasper sole-shaped ; a large patch of friction-scales ; these scales long and narrow ; eighth tergite with a belt of enlarged scales all round the edge ; harpe (Pl. XXXII. f. 15) resembling that of *Polyptychus hollandi* to a certain extent, being distally sinuate, the two lobes short, especially the ventral one. Penis-sheath (Pl. XXX. f. 27) with a rather high dentate ridge before the end ; from the interior of the sheath projects a sharply pointed, strongly chitinised process.

♀. Antenna andromorphic, segments slightly rounded in dorsal view. Spots at hinder angle of forewing smaller than in ♂, distal margin less sharply dentate, apical area of forewing and anal area of hindwing not quite so deep in colour. Not dissected ; a high smooth ridge visible before vaginal cavity, slightly sinuate mesially, the sinus triangular.

Length of forewing : ♂, 30 mm. ; ♀, 37 mm.

Hab. British Central Africa.

One ♂ (*type*) in the Tring Museum from Likoma, Lake Nyassa, 24. iii. '96 (Rev. Dutton).

In the British Museum 1 ♀ from Nengia, British Centr. Africa (Crawshay) ; 1 ♂, aberrant, from Umtali, Mashonaland, 3700 ft., December 1900 (Marshall).

The latter ♂ is buffish wood-brown, smaller than the *type*. The first line of the hindwing below stands at the base of M^2, the tenth sternite is square in basal half, with the angles not rounded, the harpe is smaller, and the dentate ridge of the penis-sheath longer.

LIV. MARUMBA.—Typus : *dyras*.

Sphinx, Scbiff. & Den. (*non* Linné, 1758), *Syst. Verz. Schmett. Wien* p. 42 (1776).
Smerinthus Latreille, *Hist. Nat. Crust. Ins.* iii. p. 401 (1802) (partim ; incl. type of *Sphinx*).
Laothoë Fabricius, in Illig., *Mag. Ent.* vi. p. 287 (1807) (partim ; incl. type of *Sphinx*).
Polyptychus Hübner, *Verz. bek. Schm.* p. 141 (1822) (partim ; type : *dentatus*).
Merinthus Meigen, *Handb. Schm.* p. 100 (1827) (correct. of *Smerinthus*!).
Triptogon, Butler (*non* Ménétriés, 1857), *Proc. Zool. Soc. Lond.* p. 253 (1875) (*nom. indescr.*).
Metamimas id., *Trans. Zool. Soc. Lond.* ix. p. 582 (1877) (partim ; type : *australasiae*).
Mimas, id. (*non* Hübner, 1822), *l.c.* p. 583 (1877).
Marumba Moore, *Lep. Ceyl.* ii. p. 8 (1882) (type : *dyras*).
Sichia Tutt, *Brit. Lep.* iii. p. 386 (1902) (nom. nud.).
Burrowsia id., *l.c.* (nom. nud.).
Kaycia id., *l.c.* (nom. nud.).

♂♀. Tongue very short and weak, the two halves quite separate in several species (Pl. LXI. f. 10. 11). Pilifer a short, obtuse, triangular process. Palpus larger in ♂ than in ♀, visible from above in ♂, second segment about twice as long

as broad, joint more or less open, at least in ♂. Antennal segments deeply grooved in ♂, rather feebly in ♀, ciliae much longer in ♂ than in ♀, last segment short, penultimate one higher than long. Abdominal tergites without broad scales, densely spinose all over. Tibiae *spinose*, hindtibia as long as, or longer than, the first two tarsal segments ; spurs not spinose, *one* pair to hindtibia, short ; tarsi stout, some of the spines of the underside more or less erect and inclining mesiad ; pulvillus and paronychium present, the upper lobe of the latter broad. Distal margin of forewing more or less undulate ; apex of hindwing rounded, proportional length of D^2 and D^3 variable, but D^2 never twice the length of D^3, sometimes even shorter than D^3 ; pattern almost the same in all the species. No organ of friction on clasper and eighth tergite.

Clasper and harpe similar in the various species : the former (Pl. XXXIV. f. 13—18) divided distally into a dorsal and a ventral lobe, the dorsal lobe mostly strongly chitinised and pointed, the ventral one obliquely rounded, weak, both close together, imperfectly separated ; harpe represented by a very strongly chitinised hook curving upwards ; a subdorsal basal fold of the clasper is produced mesiad into a plate which lies above the penis-sheath and is prolonged distad into a sharp process which corresponds to the processes *pdr* and *pdl* of *Polyptychus trilineatus* ; the process is the same on both sides, while in *Polyptychus trilineatus* the left one differs from the right one. Penis-funnel short, more or less transversely folded above (Pl. XXXIV. f. 14) ; penis-sheath without processes, but more or less rugose or granulose at the end. Vaginal plate see Pl. XVIII. f. 15—22.

Larva granulose ; head triangular.—Food-plants : *Tilia* ; *Prunus* ; *Pirus* ; *Quercus* ; etc.

Pupa somewhat glossy, rugate ; two small frontal tubercles ; labrum and pilifer distinct ; smooth part of eye polished, tongue-case about 5 mm. shorter than foreleg ; cremaster very rough above, tip divided, short (*quercus*).

Hab. Oriental and Palaearctic Regions, as far east as the Southern Moluccas and the Tenimber Islands.

The mouth parts are very variable according to species and individuals. The tongue of *quercus* and *jankowskii* is always devoid of a fringe at the inner edge—by means of which the two halves of the tongue are kept together—while the fringe is present in all the other species (Pl. LXI. f. 11). The pilifer is also much reduced in *quercus* (Pl. LXI. f. 10) and is devoid of the clothing of bristles or scales found elsewhere. In *sperchius* (Pl. LXI. f. 11) the bristles are few in number, being replaced by hairs and scales. In some individuals of *gaschkewitschi* and *cristata* the pilifer is longer and bears the normal brush of brown bristles, while other individuals of the same species resemble *sperchius* in this respect or stand intermediate. *M. quercus* has no distinct epistome ; in *sperchius* and *cristata* (Pl. LXI. f. 11, *ep*), it is represented by an obtusely triangular lobe, and in *spectabilis* by a sinuate lobe. The labrum bears a transverse ridge, variously shaped in the different species, being almost tuberculiform in *cristata*, very high and mesially somewhat sinuate in *spectabilis*, etc.

The relationship of *Marumba* with the Oriental *Polyptychus* is clearly demonstrated by the sexual armature of the ♂. The development of the clasper apically into a dorsal and a ventral lobe and the presence of two processes above the penis-funnel point directly to *Polyptychus trilineatus*.

It is very interesting to note that the African *Likoma apicalis*, which agrees

with *Marumba* in the loss of the proximal pair of spurs on the hindtibia and also in pattern, has the sexual armature of the ♂ similar to that of some *African Polyptychus*, the clasper not being divided, and bearing a patch of friction-scales, the eighth tergite having a corresponding organ of friction, the tenth sternite being divided, the penis-sheath bearing a lateral tooth, and there not being any processes above the penis-funnel. This African *Likoma* is clearly a derivation from an African *Polyptychus*, while the Oriental (and Palaearctic) *Marumba* are derived from an Oriental *Polyptychus*. The absence of the proximal pair of hindtibial spurs does not mean closer relationship between *Marumba* and *Likoma* than between these and *Polyptychus*, but is the outcome of parallel development; the tendency of the spurs to become obliterated is obvious in all groups of asemanophorous *Sphingidae*.

The pattern of the wings is very uniform, varying only in details in the different species.——Forewing: a subbasal and three or four antemedian lines, the latter more or less convergent behind; a discal line at (seldom) or beyond end of cell, immediately followed by one or two feeble lines; three postdiscal lines, more or less strongly ∫-shaped (on right wing; ∫-shaped on left wing), curving round a double spot situated upon M^2 and SM^2 near angle of wing, one of these three lines mostly vestigial.——Hindwing with double spot before anal angle as remnant of a postdiscal band.

On the underside we find no lines in the basal half of the forewing, while the hindwing bears three lines between the base of M^2 and distal margin, the most proximal one being as a rule accompanied distally by vestiges of one or two more lines, of which one is often rather distinct.

This similarity in pattern misled Hampson to unite under *M. dyras* no less than five distinct species.

Key to the species:

a. Foretibia ending in a long thorn or claw — 240. *M. indicus*.
Foretibia without apical thorn . . . — *b*.

b. Hindwing red . . . . . — 230. *M. gaschkewitschi*.
Hindwing burnt umber-brown, russet, tawny, ochraceous, or buff . . . — *c*.

c. Costal and distal marginal areas of hindwing ochre-yellow . . . . — 236. *M. maacki*.
Costal and distal marginal areas of hindwing not ochre-yellow . . . . — *d*.

d. Distal margin of forewing concave between SC^5 and R^3, apex almost truncate . . . . . — *j*.
Not obviously concave . . . . . — *e*.

e. The most distal brown line of underside of hindwing absent, or barely vestigial, but its white border distinct; forewing below with sharply defined tawny or ochraceous apical area . — 237. *M. jankowskii*.
The most distal brown line of hindwing distinct, or forewing below without tawny apical area . . . . . — *f*.

f. Forewing below with a large, anteriorly rather sharply defined, orange-tawny area extending from R^3 to near hinder margin, rest of wing very much darker	232.	*M. spectabilis.*
Forewing without that patch, or the patch small and clayish tawny, not well defined anteriorly		*g*.
g. Body above with a prominent mesial line; upperside of wings and body very uniform in colour, without distinct pale shades, subanal spot M^2 of hindwing absent or vestigial . . .	231.	*M. cristata.*
Body without heavy mesial line, or wings with pale shades		*h*.
h. Forewing with the most distal line double, the exterior one of the pair the heavier	233.	*M. dyras.*
Forewing with the most distal line not double, or the exterior one of the pair vestigial		*i*.
i. Forewing below uniformly vandyke-brown, or the basal half much paler than the distal half	235.	*M. timora.*
Forewing below pale ochraceous-buff or cream-colour, much shaded with grey	238.	*M. sperchius.*
j. Forewing below cream-colour; apical area not tawny	239.	*M. quercus.*
Forewing below pale ochraceous-buff; apical area tawny, sharply defined .	234.	*M. amboinicus.*

Butler enumerated these species under *Triptogon*—except *quercus*, which he put together with *tiliae* and *decolor* into *Mimas*—and quoted Bremer as author of *Triptogon*. Moore, when proposing the new name *Marumba*, said that the type of *Triptogon* was *dissimilis*, an insect generically distinct from *Marumba*. Neither Butler nor Moore had read, we think, what Bremer said in the place which they quote. He distinctly stated that he placed *dissimilis* only provisionally into *Triptogon*—a nondescript genus proposed in 1857 by Ménétriés for some South American *Sesiinae*—and that he would bring it into a new genus in a later paper, which intention he did not carry out. How Butler and Moore arrived at the conclusion that *dissimilis* was the type of *Triptogon* we are at a loss to understand.

Kirby, in his Catalogue, placed *quercus* into a separate genus, which he called *Laothoë*; there is no justification whatever for separating *quercus* from *jankowskii*, *sperchius*, etc. It is needless to show that Butler's *Mimas* was quite unnatural; the three species under that name belong to three genera. Collectors of Palaearctic Lepidoptera are, as a rule, contented with placing the species of *Marumba* together with a motley of other forms under the generic term *Smerinthus*; Staudinger and Rebel, in their Catalogue, separating, however, *tiliae* from the rest as *Dilina!* A

curious instance of inconsistency. On the other hand, Tutt, *l.c.*, proposed for species of *Marumba* several generic names, without giving definitions.

230. Marumba gaschkewitschi.

Smerinthus gaschkewitschi Bremer & Grey, in Motsch., *Et. Ent.* i. p. 62. n. 20 (1852) (Pekin ;—Mus. St. Petropolis) ; id., *Schm. N. China's* p. 13. n. 58. t. 5. f. 2 (1853).

Polyptychus gaschkewitschi, Leech, *Trans. Ent. Soc. Lond.* p. 276. n. 36 (1898) (=*complacens* =*roscipennis*=*carstanjeni*=*heynei* ; Yokohama ; Nagasaki, v. ; Hakodate ; Mupin, vi.).

♂♀. Antenna rather short and thin, seriated ciliae very short in ♀. Pilifer variable. Tongue with long ciliae. Hindwing above, and basal half or two-thirds of forewing below red. Spots at anal angles of fore- and hindwing generally large, those of hindwing mostly merged together, seldom small.

♂. Tenth tergite (Pl. XXVI. f. 5. 6) broad, the lobes rounded, their inner edge often obviously more oblique than the outer edge, this not continuous with the lateral edge of the more proximal part of the plate which ends in a ventral fold (*n*) ; Pl. XXVI. f. 6 gives a side-view of the apex of the tergite ; the sternite (*Xe*) vestigial, represented by an inconspicuous fold which bears no mesial lobe ; the lateral piliferous tubercles (*t*) strongly developed. Clasper in shape halfway between those of *sperchius* and *amboinicus*, the dorso-apical lobe pointed, somewhat curving downward ; harpe similar to that of *sperchius* ; the two processes above the penis-sheath broad.

♀. Distal edge of vaginal plate (Pl. XVIII. f. 21. 22) incrassate ; proximal edge of orifice raised to a high ridge which covers the orifice in a ventral view ; the outer surface of the ridge convex, its edge irregularly notched, mesially more or less deeply incised ; the proximal part of the vaginal plate deeply concave, mesially obtusely carinate, this cavity laterally limited by the lower end of the eighth tergite which projects ventrad.

Larva not sufficiently known : yellowish green, with seven thin white side-bands, in front of which stand red blotches, granulose ; horn straight and long.—Food-plants : *Prunus* ; *Pirus* ; *Crataegus*.

Chrysalis not described.

Hab. Japan, Amurland to Amoy and Moupin.

Four subspecies, which differ in colour and in the sexual armature of the ♀, apparently not in that of the ♂.

a. M. gaschkewitschi carstanjeni.

**Smerinthus carstanjeni* (*roscipennis* Butl. var. ?) Staudinger, in Rom., *Mém. Lép.* iii. p. 159. t. 9. f. 2. a. b. (1887) (Ussuri ; larva on *Prunus* and *Pirus* ;—coll. Staudinger).

Smerinthus gaschkewitschi var. *carstanjeni*, Graeser, *Berl. Ent. Zeitschr.* xxxii. p. 105. n. 189 (1888) (Amurland ; larva mentioned) ; Staud., *Lc.* vi. p. 234. n. 224 (1892) (Amur) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. n. 722 (1901) (Ussuri merid.).

Smerinthus roscipennis, Bartel, in Rühl, *Grossschm.* ii. p. 162 (1900) (partim ; Amur).

♂♀. Only bred specimens seem to us to be in collections, and these appear to be more or less dwarfed. The small size, however, may be a character of the Amur form. A series of caught specimens should be compared. Individuals as small as a medium-sized *carstanjeni* occur also in Japan. Many examples have an ochraceous-red tint (only bred ones ?). Markings strongly pronounced ; fringe conspicuously white between the veins.

♀. Ridge in front of vaginal orifice (Pl. XVIII. f. 22) with a small mesial sinus ; the edge either irregularly denticulate or smooth.

Larva mentioned by Graeser; said to be similar to that of *Sphinx ocellata.*—— A thorough study of the Amur larvae is a desideratum. The larvae of the Amur *Sphingidae* have nearly all been found by the travellers who collected for commercial purposes, but not one is properly described.

Hab. Amurland.

In the Tring Museum 9 ♂♂, 3 ♀♀.

b. M. gaschkewitschi gaschkewitschi.

Smerinthus dyras var β., Walker, *l.c.* viii. p. 251. sub n. 13 (1856) (Shanghai, ♀).

Smerinthus gaschkewitschi Bremer & Grey, *l.l.c.c.* ; Mén., *Enum. Corp. Anim. Mus. Petr., Lep.* i. *Suppl.* p. 94. n. 1563. t. 13. f. 4 (1857) (Pekin) ; Walk., *l.c.* p. 40 (1864) ; Bart., in Rühl, *Grossschm.* ii. p. 161 (1900) (Pekin) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. n. 722 (1901) (partim ; China sept.).

Smerinthus gaschkeritschi (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 19. n. 3 (1875).

Triptogon gaschkewitschi (!), Butler, *Trans. Zool. Soc. Lond.* ix. p. 588. n. 21 (1877) (Pekin ; "Mongolia" ex err. ?) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 27. n. 105 (1892) (Shantung).

Smerinthus gaschkewitchi (!), Austaut, *Le Natural.* xiv. p. 68 (1892).

Marumba gaschkewitschi, Kirby, *Cat. Lep. Het.* i. p. 707. n. 11 (1892).

Smerinthus complacens, Bartel, *l.c.* p. 163 (1900) (partim ; Shanghai).

♂♀. Upper- and underside of body and wings paler than in the other subspecies; mesial line of abdomen not marked or vestigial ; anal angle of hindwing above with a greyish white patch proximally of the brown spot. Underside darker in ♂ than in ♀, hindwing pinkish grey in ♀, with the marginal area more or less pale pinkish tawny, in ♂ uniformly drab-colour, scarcely with a vestige of red. Fringe of both wings conspicuously white between the veins.

♀. Vaginal plate as in *carstanjeni*, the edge rather thicker.

Larva not known.

Hab. North China : Pekin.

In the Paris Museum 1 ♂, 2 ♀♀ from north of Pekin (A. David), one of the ♀♀ transferred to the Tring Museum.

This and the following are possibly seasonal forms of the same Chinese subspecies.

c. M. gaschkewitschi complacens.

**Smerinthus complacens* Walker, *Cat. Lep. Ins. B. M.* xxxi. p. 40 (1864) (Amoy, ♀ ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 30. n. 19 (1875) ; Bartel, in Rühl, *Grossschm.* ii. p. 163 (1900) (partim ; Amoy).

Triptogon complacens, Butler, *Trans. Zool. Soc. Lond.* ix. p. 588. n. 19 (1877) (partim ; Amoy) ; id., *Illustr. Typ. Spec. Lep. Het. B. M.* iii. p. 2. t. 41. f. 4 (1879) (partim).

Marumba complacens, Kirby, *Cat. Lep. Het.* i. p. 707. n. 8 (1892) (partim).

Marumba gaschkewitschi ab. *complacens*, Rothschild, Nov. Zool. i. p. 98 (1894).

Polyptychus gaschkewitschi, Leech, *Trans. Ent. Soc. Lond.* p. 276. n. 36 (1898) (partim; Moupin, vi.).

♂♀. Darker than the two preceding forms ; fringe of forewing with the white spots vestigial ; underside of hindwing and of body washed with red all over. Forewing rather more elongate than in the other subspecies.

♀. Vaginal plate as in the preceding form, the ridge thicker than in *carstanjeni* and the sinus much less deep than in the following subspecies.

Larva not known.

Hab. Southern and Central China : Amoy, Foochow, Kiangsi, Moupin.

In the Tring Museum 1 ♂ from Foochow; another ♂ from the same locality, contained in the Brit. Mus., agrees almost exactly with the preceding subspecies.

In the Paris Museum 1 ♂, 2 ♀♀ from Moupin and Kiangsi.

Also several specimens in coll. Charles Oberthür and the British Museum.

d. M. gaschkewitschi echephron.

**Smerinthus echephron* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 21. n. 6. t. 3. f. 3 (1875) (Japan;—coll. Charles Oberthür); Bartel, in Rühl, *Grossschm.* ii. p. 180 (1900) (Japan).

**Triptogon roseipennis* Butler, *Proc. Zool. Soc. Lond.* p. 257. n. 49 (1875) (Hakodate;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 588. n. 20. t. 91. f. 6 (larva) (1877) (*l.* on *Pirus* and *Prunus*).

Triptogon complacens, Butler, *Trans. Zool. Soc. Lond.* ix. p. 588. n. 19 (1877) (partim; Japan); Leech, *Proc. Zool. Soc. Lond.* p. 585. n. 22 (1888) (= *roseipennis*; Yokohama, Nagasaki, Hakodate); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 26. n. 103 (1892) (partim; Japan).

Smerinthus heynei Austaut, *Le Natural.* xiv. p. 68. n. 1 (1892) (Japan).

Marumba echephron, Kirby, *Cat. Lep. Het.* i. p. 706. n. 7 (1892) (Japan).

Marumba complacens, id., *l.c.* p 707. n. 8 (1892) (partim; Japan).

Marumba roseipennis, id., *l.c.* n. 9 (1892) (Japan).

Marumba heynei, id., *l.c.* p. 932. n. 36 (1892).

Smerinthus maassani Staudinger, in Rom., *Mém. Lép.* vi. p. 236. sub n. 224 (1892) (Japan).

Marumba gaschkewitschi ab. *roseipennis*, Rothschild, Nov. Zool. i. p. 98 (1894).

Polyptychus echephron, Leech, *Trans. Ent. Soc. Lond.* p. 276. n. 35 (1898) (probably form of *dyras*!).

Smerinthus sperchius, Bartel, *l.c.* p. 158 (1900) (partim; sub synon.).

Marumba gaschkewitschi ab. *echephron*, id., *l.c.*

Smerinthus roseipennis, id., *l.c.* p. 162 (1900) (partim; Japan).

Smerinthus complacens, id., *l.c.* p. 163 (1900) (partim; Japan).

Smerinthus gaschkewitschi var. *roseipennis*, Staudinger & Reb., *Cat. Lep.* ed. iii. p. 99. sub n. 722 (1901) (Japan).

Burrowsia roseipennis, Tutt, *Brit. Lep.* iii. p. 386 (1902).

♂♀. The pair from which Boisduval drew up his description of *echephron* is discoloured; it belongs to the present species, not to *dyras* as suggested by Leech; the name of *echephron* has been left out in the catalogue of Staudinger and Rebel.

In colour very close to *complacens*, but the underside decidedly more restricted red, especially in the ♂ and on the hindwing. Size variable, fringe without distinct white spots in some specimens, but in most nearly as conspicuously spotted as in *carstanjeni*. First line of underside of hindwing on the whole rather more distal than in the other subspecies, sometimes 1 or 2 mm. distant from cell.

♀. Vaginal plate differing from that of the Continental forms in the ridge being deeply incised (Pl. XVIII. f. 21): this character applies to all the specimens examined, but in some the sinus is less deep than in others.

Larva figured by Butler, *l.c.*

Hab. Japan: Hakodate to Nagasaki.

In the Tring Museum 15 ♂♂, 23 ♀♀ from various places of Japan, caught in May, June, and July.

231. **Marumba cristata.**

**Triptogon cristata* Butler, *Proc. Zool. Soc. Lond.* p. 253. n. 39 (1875) (Darjiling;—Brit. Mus.); id., *Trans. Zool. Soc. Lond.* ix. p. 586. n. 1 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 25 n. 136 (1887) (Sikhim).

Marumba cristata, Kirby, *Cat. Lep. Het.* i. p. 707. n. 21 (1892).

Polyptychus dyras, Hampson (*non* Walker, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 69. n. 91 (1892) (partim); Leech, *Trans. Ent. Soc. Lond.* p. 276. n. 34 (1898) (partim; Omei-shan, vii.).

♂♀. This sombre-coloured insect is very constant, and cannot easily be confounded with any species except in a moment of thoughtlessness. The uniform colour of the upperside, the heavy black mesial line of the body, the simple lines

of the forewing, the presence of a small creamy white stigma on the forewing, the absence of the first anal spot from the hindwing, and the rosy tint of the underside separate *cristata* at a glance from the other *Marumba*. Antenna of ♂ less than one-third the length of the forewing, thinner than in *dyras*: in ♀ grooved, the seriated basal ciliae of the middle segments nearly as long as the segments. Tarsi very stout.

♂. Tenth tergite (Pl. XXVI. f. 2) deeply divided into two slender lobes which are pointed; sternite triangular, rather broad, not acute, slightly curved upwards at the apex, covered with minute granules. Clasper (Pl. XXXIV. f. 18) differing essentially from that of the allied species in the dorso-apical lobe being pointed and curved upwards and in the ventral lobe being broad and rounded; harpe not so strongly curved as in *sperchius* and *dyras*, not denticulate, reaching nearer to the end of the clasper.

♀. Vaginal plate (Pl. XIX. f. 1) with a long, truncate or slightly sinuate, process in front of the orifice, which process becomes visible on removal of some scales from the apex of the seventh sternite; at each side stands a dentate flap (*l*).

Early stages not known.

Hab. Sikhim; W. China.

In the Tring Museum 6 ♂♂, 7 ♀♀ from Sikhim, some in June.

232. **Marumba spectabilis.**

**Triptogon spectabilis* Butler, *Proc. Zool. Soc. Lond.* p. 256. n. 48 (1875) (Darjiling;—Mus. Brit.).

♂♀. Antenna shorter and thinner than in *dyras*. A much more conspicuously coloured insect than *dyras*, *sperchius* and *cristata*. *Underside*: a large area between hinder angle and R^3 of forewing, and a submarginal patch before anal angle of hindwing, of an orange-tawny colour.

♂. Tenth tergite (Pl. XXVI. f. 1) deeply divided, the lobes slender, obliquely rounded at end, not pointed; sternite a low ridge, mesial lobe short and broad, almost vestigial. Dorso-apical lobe of clasper more curved downward than in *sperchius* and *dyras*; harpe not dentate, long, resembling that of *amboinicus*.

♀. Antevaginal ridge of vaginal plate (Pl. XIX. f. 2) sinuate in front of the vaginal orifice, the lobes rounded; from each side of the ridge extends a longitudinal fold towards the eighth sternite.

Early stages not known.

Hab. N. India; Sumatra.

Two subspecies:

a. M. spectabilis spectabilis.

**Triptogon spectabilis* Butler, *l.c.* (1875); id., *Trans. Zool. Soc. Lond.* ix. p. 588. n. 15. t. 93. f. 1 (1877) (Darjiling); Cot. & Swinh., *Cat. Moths Ind.* i. p. 27. n. 147 (1887) (Darjiling); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 27. n. 109 (1892).

Marumba spectabilis, Kirby, *Cat. Lep. Het.* i. p. 707. n. 14 (1892).

Polyptychus spectabilis, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 71. n. 92 (1892) (♂, Sikhim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 406. n. 92 (1898) ("not seen").

♂♀. Underside of wings: forewing with an apical patch of the same orange-tawny colour as the anal area; first discal line several mm. proximal of base of SC^5; first line of hindwing between M^1 and M^2, fourth line angulate behind R^3, 4 to 6 mm. distant from tip of M^1. Tenth abdominal tergite (Pl. XXVI. f. 1) with

the lobes obliquely rounded at the tip, the sternite slightly dilated, rounded in middle.

Hab. North India: Sikhim.

In the Tring Museum 4 ♂♂.

b. M. spectabilis malayana subsp. nov.

♂. Hindwing with the apex less rounded than in the preceding subspecies. Wings, *below*.——Forewing with the orange-tawny apical patch barely indicated, first line just proximal of base of SC^5 (fork), fifth line—the fourth quite indistinct—continued to tip of M^1, not interrupted or obsolescent behind R^3.——Hindwing: first line at lower angle of cell, not in cell, fourth not angulate between R^3 and M^1, barely 3 mm. from tip of M^1. Lobes of tenth tergite notched, not obliquely rounded; sternite with the mesial part dilated to a triangular, short and broad lobe.

♀. Not known.

Hab. Benkoelen, West Sumatra (Eriesson), 1 ♂ in the Tring Museum. *L. spectabilis* occurs doubtless in the countries between Sumatra and Sikhim, and most likely also on Borneo and Java. The discovery of the species in Sumatra is very interesting, as hitherto the insect was known only from Sikhim.

233. **Marumba dyras.**

**Smerinthus dyras* Walker, *List Lep. Ins. B.M.* viii. p. 250. n. 13 (1856) (partim; Ceylon; Silhet; Shanghai;—Mus. Brit.).

Marumba dyras, Moore, *Lep. Ceyl.* ii. p. 9. t. 78. f. 1. a, b, c. (*l.*, *p.*, ♂♀) (1882).

♂♀. Tongue with fringe. Pilifer with brush of bristles. Antenna one-third the length of the forewing in ♂, a little shorter in ♀. Of the most distal double line of the forewing the external one is much heavier than the proximal one; the former stops mostly at M^1, but is occasionally continued beyond this vein, curving basad and ending at the marginal spot; the inner line encircles spot M^2, its posterior portion is often very faint. The marginal area beyond this double line is tawny or brown on the under surface, seldom of the same colour as the disc. Ground-colour, and number and position of lines variable individually; the first line of the underside of the hindwing seldom in cell, often well outside cell.

♂. Tenth tergite (Pl. XXVI. f. 9) divided into two rounded lobes; sternite pointed, triangular, or bell-shaped, rather variable in shape (Pl. XXVI. f. 9. 10. 11. 12). Dorso-apical lobe of clasper pointed, shorter than in *sperchius*; harpe more strongly hook-shaped, about midway between the harpes of *sperchius* and *amboinicus*, not denticulate; processes above penis-sheath long, granulose.

♀. Vaginal plate (Pl. XVIII. f. 17. 18) with a more or less prominent rounded tubercle in front of the vaginal orifice.

Larva green, bluish green when adult, covered with "paler short granular spines," six side-bands on segments 4 to 11; head triangular; horn straight, spinose. Moore figures on the same plate a gallstone-yellow caterpillar with seven red side-bands and a curved horn. Is this really the same species?—Food-plants: *Sterculariaceae*.

Pupa insufficiently described; said to have a short exserted proboscis, which is a mistake; cremaster apparently long, narrow in side-view (Moore's figure).

Hab. From N.W. India and China to Ceylon, the Philippines and Java.

Two subspecies:

a. M. dyras dyras.

**Smerinthus dyras* Walker, *l.c.* (1856).

Smerinthus dyras, Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 264. n. 608 (1857) (partim ; Darjiling) ; id., *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 20. n. 5 (1875) (partim ; Bengal ; Silhet ; China) ; Bartel, *l.c.* p. 160 (1900) (partim).

**Triptogon sinensis* Butler, *Proc. Zool. Soc. Lond.* p. 254. n. 41 (1875) (Hongkong ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 587. n 7 (1877).

**Triptogon ceylanica* Butler, *Proc. Zool. Soc. Lond.* p. 255. n. 43 (1875) (Ceylon ;—Mus. Brit.) ; id , *Trans. Zool. Soc. Lond.* ix. p. 587. n. 9 (1877).

**Triptogon silhetensis* Butler, *Proc. Zool. Soc. Lond.* p. 255. n. 44 (1875) (Silhet ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 587. n. 10 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 26. n. 142 (1887) (Silhet ; Sikhim).

**Triptogon oriens* Butler, *Proc. Zool. Soc. Lond.* p. 255. n. 45 (1875) (N.E. India ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 587. n. 11. t. 93. f. 3 (1877) ; Cot. & Swinh., *l.c.* i. p. 26. n. 143 (1887).

**Triptogon massuriensis* Butler, *Proc. Zool. Soc. Lond.* p. 256. n. 46 (1875) (Massuri ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 587. n. 12. t. 93. f. 5 (1877) ; Cot. & Swinh., *l.c.* i. p. 26. n. 144 (1887) (Massuri).

**Triptogon fuscescens* Butler, *Proc. Zool. Soc. Lond.* p. 256. n. 47 (1875) (Darjiling ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 587. n. 13. t. 93. f. 2 (1877) ; Cot. & Swinh., *l.c.* i. p. 26. n. 145 (1887).

Triptogon dyras, Butler, *l.c.* ix. p. 586. n. 6 (1877) (Ceylon ; Canara) ; Cot. & Swinh., *l.c.* i. p. 26. n. 140 (1887) (Silhet ; Sikhim ; Kanara ; Ceylon ; Subathu ; Sibsagar) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 27. n. 106 (1892) (Assam ; Ceylon).

**Triptogon andamana* Moore, *Proc. Zool. Soc. Lond.* p. 595 (1877) (Pt. Blair ;—Mus. Brit.) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 27. n. 148 (1887).

Marumba ceylonica (!), Moore, *Lep. Ceyl.* ii. p. 9. t. 79. f. 2 (1882).

Marumba dyras, id., *l.c.* p. 9. t. 98. f. 1. a. b. c. (*l., p.*, ♂ ♀) (1882) ; Kirby, *Cat. Lep. Het.* i. p. 708. n. 24 (1892).

Triptogon ceylonica (!), Cotes & Swinh., *l.c.* i. p. 26. n. 141 (1887) (Ceylon) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 28. n. 110 (1892) (Laos, Siam ; Ceylon).

Marumba massuriensis (!), Kirby, *Cat. Lep. Het.* i. p. 706. n. 2 (1892).

Marumba oriens, id., *l.c.* n. 3 (1892).

Marumba silhetensis, id., *l.c.* n. 5 (1892).

Marumba fuscescens, id., *l.c.* p. 707. n 15 (1892).

Marumba ceylonica, id., *l.c.* n. 17 (1892).

Marumba andamana, id., *l.c.* p. 708. n. 23 (1892).

Marumba sinensis, id., *l.c.* n. 25 (1892).

Polyptychus dyras, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 69. n. 91. f. 42 (*l.*) (1892) (partim) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 406. n. 91 (1898) (Sikhim & Bhutan, up to 3500 ft., v. to viii. ;—probably a mixture of species).

Marumba dyras ab. *sinensis*, ab. *ceylanica*, ab. *fuscescens*, ab. *silhetensis*, ab. *oriens*, ab. *massuriensis* (!), Rothschild, Nov. Zool. i. p. 98 (1894).

♂ ♀. Sir George Hampson was quite right in sinking *fuscipennis*, *oriens*, *inensis*, etc., as synonyms of *dyras*. But in the scramble of these Butlerian species" for accommodation under the roof of a mutilated but hospitable dryad, me strangers managed to squeeze in who were not billeted there. The row of fteen synonyms under *dyras* of Hampson looks very imposing ; seven of the mes, however, have no business to be there, and the eighth (*javanica*) has also me claim to a separate place.

Though we treat of the specimens belonging to the species *dyras* only under vo subspecies, we are not at all certain that there are not more geographical forms. s in many other *Ambulicinae* the sexnal armature seems to vary much more ographically than individually. Unfortunately the material at disposal is rather eagre, excepting that from North India and Java, and therefore we cannot do ore at present than indicate in what the few individuals dissected differ. It is

quite possible that the differences which appear to us to be geographical will turn out to be individual on examination of larger numbers, and this is the reason why we leave the specimens from continental Asia, Ceylon and the Andamans under one subspecific name. There are names for nearly all the possible subspecies of which specimens exist in collections. The name of *dyras* would apply to the Ceylon form.; *massaurensis* to that from N.W. India: *oriens*=*fuscescens* to that from Sikhim and Bhutan; etc.

In the Sikhim specimens the tenth sternite of the ♂ (Pl. XXVI. f. 9) is elongate-bell-shaped, the sides being rounded, and the mesial tubercle of the vaginal plate (Plate XVIII. f. 17) of the ♀ is heavy, globose, more or less faintly grooved in middle.

The specimens from Assam have a more slender and longer tenth sternite, it being sometimes very narrow and straight (Pl. XXVI. f. 12), while the antevaginal tubercle is the same as in the Sikhim individuals.

In South Indian ♂♂ the tenth sternite stands in shape midway between that of Sikhim and Assam examples, while it is broad, obtusely triangular (Pl. XVIII. f. 10) in Ceylon individuals. The antevaginal tubercle is in Ceylonese ♀♀ very prominent, constricted at the base, knob-shaped, sulcate.

The differences in colour on which Butler relied when describing his "species" are quite inconstant.

Larva and chrysalis figured by Moore (see above).

Hab. China, Tonkin, Siam, N.W. India, Bhutan, Sikhim, Assam, southward to Ceylon and the Andamans; certainly also in Burma and Tennasserim.

In the Tring Museum 24 ♂♂, 12 ♀♀ from: Ceylon; S. India; Jaintia Hills; Khasia Hills; Sikhim; Tonkin.

b. M. dyras javanica.

Smerinthus dryas, Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 264. n. 608 (1857) (partim; Java); Boisd., *Spec. Gén. Lép. Hét.* i. p. 20. n. 5 (1875) (partim; Java); Bartel, in Rühl, *Grossschm.* ii. p. 160 (1900) (partim; Java).

Smerinthus parallelis Moore, *l.c.* (nom. nud.; sub syn.).

Smerinthus horsfieldi Moore, *l.c.* (nom. nud; sub syn.).

**Triptogon javanica* Butler, *Proc. Zool. Soc. Lond.* p. 254. n 42 (1875) (Java;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 587. n. 8 (1877).

Marumba javanica, Kirby, *Cat. Lep. Het.* i. p. 708. n. 22 (1892); Huwe, *Berl. Ent. Zeitschr.* xl. p. 370. n. 46 (1895) (Java).

Polyptychus dyras, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 69. n. 91 (1892) (partim; Java); Semp., *Schm. Philipp.* ii. p. 391. n. 21 (1896) (Luzon, ii.; Cebu; Mindanao).

Smerinthus sperchius, Piepers, *Tijdschr. Ent.* xl. p. 98. t. 1. f. 23. 24 (horn of *l.*) (1897); Bartel, *l.c.* p. 158 (1900) (partim; Java).

♂♀. Apical area of underside of forewing in ♂ less tawny than in *dyras dyras*, sometimes not more tawny than the disc; ground-colour of forewing of ♀ deeper tawny than in *dyras dyras*, less grey. Tenth abdominal sternite of ♂ broadly bell-shaped (Pl. XXVI. f. 11), broader than in the continental individuals. Mesial tubercle of vaginal plate (Pl. XVIII. f. 18) not very prominent, the part of the plate at the sides of the tubercle not concave, sometimes even slightly convex, the structure recalling that of the plate of *quercus*.

Hab. Java; Philippine Islands: Luzon, Cebu, Mindanao. Probably also on Sumatra, Borneo, and Palawan.

In the Tring Museum 2 ♂♂, 5 ♀♀ from Java.

234. Marumba amboinicus.

Smerinthus amboinicus Felder, *Sitzber. Ak. Wiss. Wien* xliii. p. 29. n. 33 (1862) (♀, Amboina ;— Mus. Tring) ; id., *Reise Novara, Lep.* t. 78. f. 1 (1874) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 21. n. 7 (1875) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 104. n. 192 (1888) (Amboina).
Smerinthus amboiniens (!), Walker, *List Lep. Ins. B. M.* xxxi. p. 41 (1864).
Metamimas amboinicus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 583. n. 2 (1877) ; Kirby, *Cat. Lep Het.* i. p. 701. n. 3 (1892).

♂♀. Distal margin of forewing concave between R^1 and R^3 ; distal area of forewing darker than rest of wing, above and below.

♂. Tenth tergite (Pl. XXVI. f. 3) comparatively slender, the sinus not very deep, the lobes with a notch at the end ; sternite with bell-shaped outline in a ventral view, strongly curved upwards, forming a pointed hook in side-view (Pl. XXVI. f. 4). The dorso-apical lobe of the clasper (Pl. XXXIV. f. 15) obliquely truncate, without a pointed dagger-like process ; hook of harpe long, pointing upwards.

♀. Vaginal plate (Pl. XVIII. f. 19. 20) with an obtuse process of geographically variable length at each side of the vaginal orifice.

Hab. Southern Moluccas and Celebes.

Two subspecies :

a. M. amboinicus amboinicus.

Smerinthus amboinicus Felder, *l.c.*

♂♀. Our series shows some variation in the position of the lines of the forewing ; in one ♂ the first discal and the most distal antemedian lines are united at M^2 and do not extend farther anad ; the distal margin is sometimes almost even, sometimes faintly undulate.

♂. Sexual armature see above.

♀. Middle part of antevaginal ridge of vaginal plate (Pl. XVIII. f. 19) not prominent, processes variable in length, but always shorter than in our specimen the Celebes form.

Hab. Southern Moluccas.

In the Tring Museum 5 ♂♂, 8 ♀♀ from Amboina (*type*, ♀, Doleschall ; in bad condition) ; Ceram ; Kayeli, Buru, iii. 1897 (W. Doherty).

b. M. amboinicus celebensis subsp. nov.

Smerinthus sperchius, Snellen (*non* Ménétriés, 1857), *Tijdschr. Ent.* xxii. p. 63. n. 3 (1879) (S. Celebes).
Smerinthus dyras, Staudinger (*non* Walker, 1856), in Rom., *Mém. Lép.* vi. p. 233. sub n. 221 (1892) (Minahassa).
Smerinthus dryas, Bartel (*non* Moore, 1865), in Rühl, *Grossschm.* ii. p. 160 (1900) (partim; Minahassa).

♂. Not known.

♀. Distal margin of forewing undulate, the rounded lobes not quite so strong as in *dyras*. Wings paler than in *amboinicus*, tibiae less blackish ; discal line of underside of hindwing crossing cell near the base of M^2. Processes of vaginal plate long (Pl. XVIII. f. 20), middle part of plate convex, prominent.

Hab. Celebes.

In the Tring Museum 1 ♀ (*type*) from Tawaya, north of Palos Bay, viii., ix. 1896 (W. Doherty).

235. **Marumba timora** spec. nov.

♂. A small species resembling *dyras* and *sperchius*. Body and wings deeper in tint, no distinct mesial line on abdomen.——Postdiscal line of forewing, or all the lines in outer half, indistinct; short line upon cross-veins distinct, the two spots at and before hinder angle minute, distal marginal area not darker than disc above and below.——Hindwing: anal spots small, separate, no grey anal area.

Underside: median line of hindwing (the most proximal one) outside cell, just touching the lower angle of the same.

Tenth tergite (Pl. XXVI. f. 13) with the lobes narrowing towards end, obtusely triangular. Dorso-apical lobe of clasper (Pl. XXXIV. f. 16) obliquely truncate, as in *amboinicus*; hook of harpe strongly curved, the tip pointing basad.

♀. Not known.

Hab. Timor and Timor Laut.

Two subspecies:

a. M. timora timora.

♂. Wings, *above*.——Forewing: basal area shaded with grey; antemedian lines approaching each other behind; inner discal line as a broadish brown shade followed by traces of the other lines; the interspace between this discal line and the antemedian ones paler than the area between it and the distal margin.——Hindwing with a trace of a brown postdiscal band.

Underside.——Forewing: basal two-thirds pale, distal area from inner discal line to margin brownish tawny, the area sharply defined.——Hindwing: a double discal line with the interspace shaded with brown, followed by a rather strongly curved third discal line which crosses R^3 midway between cell and outer margin; parallel with this line, but less distinct, is a postdiscal one.

Lobe of tenth abdominal sternite rounded at the sides, in one of the specimens almost constricted at the base (Pl. XXVI. f. 13).

♀. Not known.

Hab. Oinanisa, Dutch Timor, Nov.—Dec. 1891 (W. Doherty).

Two ♂♂ in the Tring Museum.

b. M. timora laotensis subsp. nov.

♂. More uniform in colour than the preceding, deeper in tint.——*Upperside*, forewing: the same colour from base to apex; antemedian lines parallel, the third slightly and evenly curved; line upon cross-vein distinct; lines in outer half of wing extremely faint, first discal one dentate, thin.——Hindwing: broader, apex more rounded than in the Timor form, deeper brown, a slight grey shade in anal area.

Underside: lines extremely faint.——Forewing uniform in colour except that the internal margin is paler, lines only here and there traceable.——Hindwing: geminate discal lines curved, faint, third discal line obtusely angled at R^3, here nearer the margin than the cell.——Lobe of tenth sternite triangular, proximally broader than in the preceding.

Hab. Larat, Timor Laut (= Tenimber Is.), April to middle of May 1901 (H. Kühn).

Only 1 ♂ in the Tring Museum.

236. Marumba maacki.

Smerinthus maacki Bremer, *Bull. Ak. St. Petersb.* iii. p. 474. n. 25 (1861) (Ussuri, vi. ;—Mus. St. Petrop.) ; id., *Lep. Ost-Sibir.* p. 34. n. 153. t. 3. f. 11 (1864) ; Walk., *List Lep. Ins. B. M.* xxxv. p. 1858 (1866) ; Staud. & Wocke, *Cat. Lep.* ed. ii. p. 37. n. 483 (1871) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 45. n. 35 (1875) ; Graes., *Berl. Ent. Zeitschr.* xxxii. p. 105. n. 187 (1888) (Chabaraka ; Wladiwostock ; *l.* on *Tilia cordata*) ; Staud., in Rom., *Mém. Lép.* vi. p. 233. n. 222 (1892) (Amur) ; Bartel, in Rühl, *Grossschm.* ii. p. 156 (1900) (East Siberia, v.-vii., ix.) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. n. 721 (1901) (Ussuri ; Amur " ex errore ? ").

Triptogon maacki, Butler, *Trans. Zool. Soc. Lond.* ix. p. 589. n. 22 (1877).

Marumba maacki, Kirby, *Cat. Lep. Het.* i. p. 707. n. 12 (1892).

Kageia maacki, Tutt, *Brit. Lep.* iii. p. 386 (1902).

♂♀. Pilifer short, with pale hairs and scales. The buff yellow colour of the costal and distal marginal areas of the hindwing above distinguish this species from all the others. The anal spots of the hindwing are large and merged together to an 8-shaped mark, very rarely separated.

♂. Tenth tergite as narrow in middle as in *amboinicus*, mesial sinus deep and very narrow, the lobes ladle-shaped, not notched ; lobe of sternite nearly as in Pl. XXVI. f. 9, the narrowed apical part longer, pointed, curved upwards. Dorso-apical lobe of clasper not always sharply pointed, shorter than in *dyras*, more resembling that of *quercus* ; harpe stout distally, denticulate ; processes above penis-sheath short, acute, prismatical, granulose.

♀. Proximal part of vaginal plate transverse, rounded proximally and laterally, the edges projecting, sides raised into a short cone, edge in front of vaginal orifice truncate, feebly undulate.

Larva not sufficiently described ; all green.—Food-plant : *Tilia cordata*.

Chrysalis not described.

Hab. East Siberia : Ussuri ; Wladiwostock ; according to Bartel also Transbaikalia.

Two broods, the second doubtless irregular.

Why do Standinger & Rebel query the occurrence in the Amur country ?

Bremer says that this species has some resemblance to *indicus* according to Walker's description ; Bartel also states that it resembles *indicus* somewhat in pattern. This is quite correct, inasmuch as all the species of *Marumba* are similar in pattern ; there is, however, no special resemblance whatever between *indicus* and *maacki*. The latter comes nearest to *quercus* and *jankowskii*.

In the Tring Museum 11 ♂♂, 2 ♀♀.

237. Marumba jankowskii.

**Smerinthus jankowskii* Oberthür, *Et. Ent.* v. p. 26. t. 6. f. 1 (1881) (Askold ;—coll. Charles Oberthür) ; id., *Bull. Soc. Ent. Fr.* p. 56 (1886) (*l.* on *Tilia*) ; Graes., *Berl. Ent. Zeitschr.* xxxii. p. 105. n. 188 (1888) (Wladiwostock ; larva viii.) ; Staud., in Rom., *Mém. Lép.* vi. p. 233. n. 223 (1892) (Amur) ; Bartel, in Rühl, *Grossschm.* ii. p. 157 (1900) (East Siberia ; Manchuria) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. n. 720 (1901) (Ussuri mer.).

Marumba jankowskii, Kirby, *Cat. Lep. Het.* i. p. 708. n. 26 (1892) (Askold).

♂♀. Pilifer short, with a dense brush of hair-scales, the two processes close together ; tongue without fringe, sometimes reduced to two tubercles. Seriated ciliae of the ♀-antenna as long as the segments. Variable in the tint of the ground-colour, the ♂♂ generally less tawny than the ♀♀. Anal spots of hindwing as in *maacki*, from which *jankowskii* is easily distinguished by the costal and distal

marginal areas of the hindwing being of the same dark colour as the disc, not yellow.

♂. Tenth tergite broader in the middle than in *maacki*, the apical sinus not so deep, the lobes notched laterally, with a tooth proximally of the notch, nearly as in *sperchius* ; sternite nearly as broad as in *maacki*, suddenly narrowed to a short hook, the sides sometimes sharply angled. Clasper as in *maacki*, dorso-apical lobe rather more pointed ; harpe shorter ; processes above penis-sheath as in *maacki*, slightly more slender.

♀. Anterior part of vaginal plate triangular, incrassate before the vaginal orifice, with a small smooth mesial tubercle proximally of this incrassate ridge.

Larva green, seldom cinnamon-brown, with red side-bands, which are interrupted at the joints and form the upper border of a row of pale tubercles ; head almost smooth in front.—Food-plant : *Tilia cordata*.

Chrysalis not described.

Hab. East Siberia and Manchuria, July : Askold, Wladiwostock, Ussuri, Snifun, etc.

In the Tring Museum : 5 ♂♂, 3 ♀♀ ; one larva.

238. **Marumba sperchius.**

Smerinthus sperchius Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. p. 137. n. 1565. t 13. f. 5 (1857) (Japan ;—Mus. St. Petropolis) ; Luc., *Bull. Soc. Ent. Fr.* p. 149 (1858 (=dyrus ! ex err.).

♂♀. In contradistinction to *M. dyras* and most other species the external line of the postdiscal pair is absent or vestigial, while the inner one is as distinct as the exterior discal line. The apical area outside the postdiscal line of the underside of the forewing is *not* tawny as in *dyras*. Antenna of ♂ very heavy, two-fifths the length of the forewing, obviously longer and thicker than in *dyras* ; that of ♀ slightly compressed, very feebly grooved, seriated basal ciliae barely half the length of the segment. Fringe of forewing *not* white between the veins. Mouth-parts see Pl. LXI. f. 11.

♂. Tenth tergite (Pl. XXVI. f. 8) rounded at the sides, obviously broader before the end than in the middle, the sinus narrow, the lobes notched, inner angle acute ; sternite straight, not or very feebly bent upwards, narrow and long, compressed, upperside rough with minute teeth. Dorso-apical lobe of clasper (Pl. XXXIV. f. 13) dagger-shaped ; the harpe irregularly notched and tuberculated ; processes above the penis-sheath very long and slender.

♀. Vaginal ridge convex in middle (Pl. XVIII. f. 16), with a separate rounded lobe (*l*) at each side of the orifice.

Larva green ; oblique lines of pale prominent granules ; head granulose, a row of granules from antenna upwards.

Hab. Japan to North India.

Three subspecies :

a. M. sperchius sperchius.

Smerinthus sperchius Ménétriés, *l.c.* (1857) ; Walk., *List Lep. Ins. B. M.* xxxi. p. 40 (1864) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 19. n. 4 (1875) ; Staud., in Rom., *Mém. Lép.* vi. p 233. n. 221 (1892) (Amur) ; Bartel, in Rühl, *Grossschm.* ii. p. 158 (1900) (partim ; Japan ; Amur ; Manchuria ; China) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. n. 719 (1901) (Ussuri ; Japan ; form of *dyras*).

Smerinthus dryas, Orza, *Lep. Jap.* p. 37. n. 80 (1869) (partim ; Japan) ; Bartel, *l.c.* p. 160 (1900) (partim ; Japan).

Triptogon sperchius, Butler, *Trans. Zool. Soc. Lond.* ix. p. 586. n. 4 (1877) (Japan) ; Leech, *Proc. Zool. Soc. Lond.* p. 585. n. 21 (1888) (=*piceipennis*=*gigas* ; Tsuruga, vii. ; Yokohama) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 27. n. 108 (1892) (Japan).

**Triptogon piceipennis* Butler, *Ann. Mag. N. H.* (4). xx. p. 393 (1877) (Japan ;—Mus. Brit.) ; id., *Illustr. Typ. specim. Lep. Het. B.M.* ii. p. 4. t. 21. f. 4 (1878).

**Smerinthus michaelis* Oberthür, *Bull. Soc. Ent. Fr.* p. 56 (1886) (Manchuria, vii. ;—coll. Charles Oberthür).

Marumba sperchius, Kirby, *Cat. Lep. Het.* i. p. 706. n. 6 (1892).

Marumba piceipennis, id., *l.c.* p. 707. n. 16 (1892).

Marumba michaelis, id., *l.c.* p. 707. n. 18 (1892).

Polyptychus dyras, Hampson (*non* Walker, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 69. n. 91 (1892) (partim ;—mixture of four species) ; Leech, *Trans. Ent. Soc. Lond.* p. 276. n. 34 (1898) (partim ; Moupin, vi. ; larva on Chestnut).

♂ ♀. Both wings vary somewhat in the depth of the tint ; the spots at the anal angles of fore- and hindwing are sometimes large, sometimes small, the upper one of the hindwing is absent in one of our ♀ ♀ from the right wing, while it is vestigial on the left wing. The distal area of the forewing, above, is shaded in the middle with tawny in most specimens, this shade extending basad between R^1 and R^3, in other individuals the distal area is uniform in colour. The tenth sternite of the ♂ is slightly but visibly curved upwards.

Hab. Yezzo to the Loo Choo Is. : Amurland ; Manchuria ; China.

In the Tring Museum 22 ♂♂, 18 ♀♀ from Yokohama, Tokyo, Mukoyama, dated June, July, August ; Okinawa, 12. vii. 1891 (Dr. Fritze) ; one larva.

b. M. sperchius gigas.

Smerinthus dyras Walker, *List Lep. Ins. B. M.* viii. p. 250. n. 13 (1856) (partim ; Silhet).

**Triptogon gigas* Butler, *Proc. Zool. Soc. Lond.* p. 253. n. 38 (1875) (Silhet) ; id., *Trans. Zool. Soc. Lond.* ix. p. 586. n. 2 (1877) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 12. t. 80. f. 5 (1881) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 25. n. 137 (1887).

Marumba gigas, Kirby, *Cat. Lep. Het.* i. p. 706. n. 4 (1892).

Polyptychus dyras, Hampson (*non* Walker, 1856), *l.c.* p. 69. n. 91 (1892) (partim) ; Leech, *Trans. Ent. Soc. Lond.* p. 276. n. 34 (1898) (partim).

Triptogon gigas (!), Cotes & Swinhoe, *l.c.* p. 25. sub n. 139 (1887).

Smerinthus sperchius, Bartel, in Rühl, *Grossschm.* ii p. 158 (1900) (partim).

♂ ♀. A large form ; more grey than *sperch. sperchius*, distal margin of forewing proportionally longer, the lobes rather more prominent. Tenth tergite of ♂ less deeply sinuate, the sternite straight. Mesial part (*m*) of ridge of vaginal plate rather higher than in Japanese specimens.

Hab. Assam.

In the Tring Museum 1 ♂, 1 ♀ from the Khasia Hills.

c. M. sperchius albicans.

**Triptogon albicans* Butler, *Proc. Zool. Soc. Lond.* p. 254. n. 40 (1875) (Massuri ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* p. 586. n. 3. t. 93. f. 6 (♂) (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 25. n. 139 (1887) (Dharmsala ; Massuri) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 27. n. 107 (1892).

Marumba albicans, Kirby, *Cat. Lep. Het.* i. p. 706. n. 1 (1892).

Polyptychus dyras, Hampson, *l.c.* (1892) (partim).

♂ ♀. A very pale form, the ♀ often losing the lines of the forewing and the spots in the anal area of the hindwing. Tenth tergite more deeply notched than in the two other subspecies, the sternite feebly curved.

Hab. N.W. India and (?) Sikhim.

In the Tring Museum 2 ♀ ♀, one from Randakheit ; and a ♂ labelled Sikhim, July 1893 (J. S. Pilcher).

As Col. Pilcher has been collecting also in N.W. India, it is quite possible that the person who reset his specimens (before they came to the Tring Museum) has changed some of the locality labels.

239. **Marumba quercus.**

Ernst & Engr., *Pap. Eur.* iii. p. 117. 125. t. 120. f. 165a—f. t. 122. f. 165. g (1782).

Sphinx quercus Denis & Schiffermüller, *Verz. Schm. Wien* p. 41. n. 2. p. 244. t. 1. a. f. 1. a (*l.*). b (*p*). t. 1. b. f. 1 (♀) (1776) ; Amst., in Fuessly, *Mag. Ent.* i. p. 105 (1778) ; Esp., *Eur. Schm.* ii. p. 164. t. 19. & *Suppl.* i. p. 97. t. 26. f. 1 (1779-82) ; Fabr., *Spec. Ins.* ii. p. 140. n. 3 (1781) ; Lang, *Verz. Augsb.* p. 65. n. 538 (1782) ; Fabr., *Mant. Ins.* ii. p. 92. n. 3 (1787) ; Vill., *Linn. Ent.* ii. p. 87. t. 4. f. 15 (1789) ; Borkh., *Eur. Schm.* ii. p. 108. 151. 183. n. 3 (1789) ; Gmel., *Syst. Nat.* i. 5. p. 2372. n. 48 (1790) ; Schwarz, *Raupenkald.* p. 203. 363. 508 (1791) ; Fabr., *Ent. Syst.* iii. 1. p. 356. n. 3 (1793) ; Schrank, *Fauna Boica* ii. p. 221. n. 1381 (1801) ; Bechst. & Scharf., *Forstinsect.* ii. p. 335. n. 2 (1805) ; Hübn., *Eur. Schm.* ii. p. 99. n. 3. t. 15. f. 71 (♀) (1805—) ; id., *Gesch. Schm.* ii. *Sph.* iii. t. n. b. f. 1. a. b (1806-18) ; Ochs., *Eur. Schm.* ii. p. 255. n. 4 (1808) (Wien ; Baiern ; Ungarn) ; Nag., *Hülfsb. Schm.* p. 145 (1818).

Smerinthus quercus, Latreille, *Hist. Nat. Crust. Ins.* iii. p. 401 (1802) ; God., *Lép. France* iii. p. 181. t. 17. f. 3 (1821) ; Boisd., *Ind. Meth.* p. 34 (1829) (Hung. ; Gall. mer. ; v.) ; Cant., in Silberm., *Rev. Ent.* i. p. 77 (1833) (Dep. du Var, v. vi.) ; Friv., *ibid.* ii. p. 181 (1834) (Hung.) ; Luc., *Lép. Eur.* p. 119. t. 48 (1834) ; Ramb., *Fauna Andal.* p. 329 (1842) (Malaga) ; Eversm., *Fauna Volgo-Ural.* p. 115 (1844) (Sarepta) ; Herr.-Sch., *Eur. Schm.* ii. p. 91 (1845) ; Walk., *List Lep. Ins. B. M.* viii. p. 244. n. 4 (1856) ; Ménétr., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 94. n. 1564 (1857) (Gall. ; Russ. mer.) ; Wilde, *Raupen* ii. p. 87. t. 4. f. 70 (1860) ; Staud. & Wocke, *Cat. Lep.* p. 16. n. 24 (1861) : id., *l.c.* ed. ii. p. 37. n. 482 (1871) ; Mann, *Wien. Ent. Mon.* vii. p. 22 (1863) (Varna, Bulg.) ; Led., *Ann. Soc. Ent. Belg.* xiii. p. 28 (1870) (Caucasus) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 18. n. 2 (1875) : Staud., *Hor. Soc. Ent. Ross.* xiv. p. 300 (1878) (Asia min.) ; Rom., *Mém. Lép.* i. p. 71 (1884) (Borjoum ; Eldar ; rare) ; Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889) ; Hofm., *Raup. Grossschm.* p. 30. t. 8. f. 5 (1893) ; id., *Grossschm.* p. 31. t. 18. f. 4 (1894) ; Bartel, in Rühl, *Grossschm.* ii. p. 153 (1900) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 98. n. 718 (1901) (Bavaria to S. Europe, eastw. to Mesopot. & Armen.) ; Aign., *Zeitschr. Ent.* vi. p. 137 (1901) (rearing).

Laothoë quercus, Fabricius, in Illig., *Mag. Ent.* vi. p. 287 (1807) ; Kirby, *Cat. Lep. Het.* i. p. 709. n. 1 (1892).

Polyptychus quercus, Hübner, *Verz. bek. Schm.* p. 141. n. 1518 (1822).

Sphynx (!) *quercus*, Vogel, *Schm. Cab.* vii. p. 16. t. 8. f. 3. a. b. (1825).

Merinthus quercus, Meigen, *Handb. Schm.* p. 100. n. 7. t. 9. f. 8 (1827) ; id., *Syst. Beschr. Schm.* ii. p. 150. n. 4. t. 78. f. 5 (1830).

Mimas quercus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 583. n. 1 (1877).

Sichia quercus, Tutt, *Brit. Lep.* iii. p. 386 (1902).

♂ ♀. Tongue without ciliae (Pl. LXI. f. 10) ; pilifer with the brush of bristles absent, or represented only by a few hairs ; epistome vestigial. Palpus small in both sexes. Antenna of ♂ more than one-third the length of the forewing, resembling that of *sperchius*, in ♀ cylindrical, not grooved, seriated ciliae very short. Ground-colour somewhat variable, being occasionally more or less ochraceous.

♂. Tenth tergite (Pl. XXVI. f. 7) not quite so broad as in *sperchius*, but broader than in *dyras*, the sinus very deep, the lobes pointed ; sternite triangular, pointed, curved dorsad. Dorso-apical lobe of clasper not produced in a dagger-like process ; harpe short, irregularly notched ; processes above penis-sheath not so obviously granulose as in the other species (Pl. XXXIV. f. 14, dorsal view of claspers and penis-sheath).

♀. Ridge in front of vaginal orifice incrassate, broadly rounded, slightly trisinuate, the lateral sinus continued proximad by a forked groove (Pl. XVIII.

f. 15) ; the part (*sl*) between these grooves sometimes tuberculiform ; laterally the ridge joining the tergite, the ventral part of which (*l*) is often folded.

Larva green, with yellowish granules and seven side-bands.—Food-plant : *Quercus*.

Chrysalis somewhat glossy as in *Sphinx ocellata*, densely rugose ; clypeus and frontal tubercles rather prominent ; fifth and sixth abdominal sternite with a small smooth place at each side ; cremaster rough, ending in two points.

Hab. South Germany (Bavaria), southward to Spain, Central Italy, Greece, S. Russia, Caucasia, Asia Minor, and Mesopotamia.

In the Tring Museum 2 pupae, 40 odd specimens.

240. **Marumba indicus.**

**Smerinthus indicus* Walker, *List Lep. Ins. B. M.* viii. p. 254. n. 17 (1856) (N. India ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 45. n. 36 (1875).

Triptogon indica, Butler, *Trans. Zool. Soc. Lond.* ix. p. 588. n. 18 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 27. n. 150 (1887) (Indian Mus. 1 spec.) ; Swinh., *Cat. Lep. Het. Mus. Oc.* i. p. 27. n. 104 (1892) (India).

**Triptogon rectilinea* Moore, *Proc. Zool. Soc. Lond.* p. 388 (1879) (N. India ;—Mus. Dublin) ; Waterh., *Aid Ident. Ins.* ii. t. 140. f. 5 (♂) (1883) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 27. n. 149 (1887).

Triptogon indicum, Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 13. t. 81. f. 2 (1881).

Marumba (?) *indicum*, Kirby, *Cat. Lep. Het.* i. p. 708. n. 27 (1892).

Polyptychus dyras, Hampson (*non* Walker, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 69. n. 91 (1892) (partim).

♂. Tibiae with very few spines ; foretibia ending in a long thorn as in *Agnosia orneus*. Antenna long and stout, similar to that of *sperchius*. Tenth tergite separated into two rather slender lobes (Pl. XXVI. f. 14) ; sternite rounded at the sides, apex pointed. Dorso-apical lobe of clasper pointed, curving downwards ; hook of harpe strongly curved (Pl. XXXIV. f. 17).

♀ and early stages not known.

Hab. North India.

In the British Museum, the Dublin Museum, and the Hope Museum at Oxford. In the Tring Museum 1 ♂ received in exchange from the Hope collection.

LXV. DAPHNUSA.

Daphnusa Walker, *List Lep. Ins. B. M.* viii. p. 237 (1856) (partim ; type : *ocellaris*).

Smerinthus, Boisduval (*nom* Latreille, 1802), *Spec. Gén. Lép. Hét.* i. 28 (1875).

Allodaphnusa Hnwe, *Berl. Ent. Zeitschr.* xl. p. 368 (1895) (type : *ocellaris*).

♂♀. Tongue very weak and short, the two halves filiform, separated, the fringe not always developed. Pilifers closer together than in other *Sphingidae*, and standing together with the triangular epistome on a kind of lobe or pedestal (Pl. LXII. f. 4) ; they are clothed with bristles and some scales ; genal process (*gp*) high, triangular ; carina of labrum short, high, almost tuberculiform. Palpus smooth-scaled, large in ♂, second segment angulate laterally in a ventral view ; end-surface in a plane with the frons, large, rhombiform ; joint open. Antenna grooved in both sexes ; distal segments (Pl. LX. f. 7) narrow and short, the ventral part conical, almost cylindrical ; the sensory cone at the tip of these projections long ; scales at apex of last segment long. Tibiae densely spinose ; hind-tibiae with *one* pair of short spurs ; pulvillus and paronychium present, the latter with two rather heavy lobes at each side. Abdominal tergites with the underscales

mostly long, spiniform, but weak ; spines at the edges also long and weak. Distal margin of wings entire, apex of forewing emarginate in ♀, often also in ♂ ; SC^2 and R^1 of hindwing on a *long* stalk, R^2 from near centre of cell, D^2 not or slightly curved ; frenulum and retinaculum present. Clasper without friction-scales.

Larva (in Mus. Stettin): head large, rounded : thorax and anal segments strongly tuberculated ; horn long, straight, densely tuberculated. Green, a dorso- and a ventro-lateral series of purplish brown spots, fourth segment almost entirely purple-brown, this belt produced backwards dorsally, forming a large patch on fifth segment, a large divided dorsal patch on tenth.

Hab. Indo-Malayan subregion.

One species.

The spinose tibiae, the structure of antenna and pilifer, the stalked veins SC^2 and R^1 of the hindwing and the absence of the first pair of hindtibial spurs are an aggregation of characters which is not found elsewhere.

241. Daphnusa ocellaris.

**Daphnusa ocellaris* Walker, *l.c.* (Borneo).

♂ ♀. Pattern of forewing similar to that of the species of *Marumba* ; the two tawny marks within the patch near hinder angle corresponding to the blackish brown spots of *Marumba* : the homology of the discal and postdiscal lines encircling these spots is obvious. The same applies to the hindwing and the underside.

♂. Tenth abdominal tergite (Pl. XXV. f. 27) carinate above, curved downwards, the curved part deeply cleft, each lobe bluntly pointed, very strongly chitinised at end (black), the sides dilated laterad and ventrad before the apical hook ; sternite membranaceous, vestigial. Clasper (Pl. XXXII. f. 16) reduced in size, dorsal margin bent ventrad, apex rounded, inner surface deeply concave ; from this cavity projects distally the end of the harpe in a similar way as in *Polyptychus contraria*, proximal part of harpe large (*rb*). Penis-sheath without external armature, apex more produced on one than on the other side, the projecting part often subglobose.

♀. Eighth tergite of abdomen scaled, cleft to the base. Proximal part of vaginal plate convex mesially, the proximal and lateral edges of the orifice raised into a smooth strongly chitinised ridge which is feebly sinuate ; postvaginal part of plate membranaceous, scaled.

Early stages see above.

Hab. Indo-Malayan Subregion.

Two subspecies:

a. D. ocellaris ocellaris.

**Daphnusa ocellaris* Walker, *l.c.* (♂) (1856) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 51. n. 1 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 594. n. 1 (1877) ; Swinh., *Trans. Ent. Soc. Lond.* p. 164. n. 20 (1890) (Bassein, viii.) ; id., *Cat. Lep. Het. Mus. Ox.* i. p. 28. n. 111 (1892) (Sarawak ; Singapore) ; Kirby, *Cat. Lep. Het.* i. p. 704. n. 1 (1892) (=*orbifera*) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 72. n. 97 (1892) (Borneo ; Bassein).

**Daphnusa orbifera* Walker, *Journ. Linn. Soc. Lond.* vi. p. 85 (1862) (♀, Sarawak ;—Mus. Oxford) ; id., *List Lep. Ins. B. M.* xxxi. p. 39 (1864) ; Butl., *l.c.* n. 2 (1877) (probably ♀ of *ocellaris*).

**Smerinthus oculata* Boisduval, *Spec. Gén. Lép. Het.* i. p. 29 n. 17 (1875) ("Mexico" err. loci ;—coll. Charles Oberthür).

Allodaphnusa fruhstorferi Huwe, *Berl. Ent. Zeitschr.* xl. p. 368. n. 45. t. 3. f. 2 (♀) (1895) (Java).

♂ ♀. This form varies individually in the tint of the ground-colour and the distinctness of the markings, some individuals being nearly entirely ochraceous tawny, others being more clayish wood-brown.

Hab. Philippines to Celebes, Java and Assam.

In the Tring Museum 33 ♂♂, 4 ♀♀ from : Silchar, Assam ; Bassein, Burma, viii. 1888 ; Penang, from October to May (C. Curtis) ; Selangore, v. (C. Curtis) ; Pahang ; Singapore ; N.E. Sumatra ; Palembang ; N. Borneo ; Mt. Dulit, viii.—xii. (Hose) ; Kuching ; Mindoro, xii. 1894 (A. Everett) ; Macassar, Celebes.

b. D. ocellaris ailanti.

**Smerinthus ailanti* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 28. n. 16. t. 3. f. 2 (1875) (Hongkong ;— coll. Charles Oberthür).

♂. Differs slightly from the preceding form in the outer margin of the forewing being more convex behind middle, the first discal line more curved, the stigma indistinct, the hindwing more rounded at apex and less sinuate before anal angle. Hook of harpe rather longer. Further material may possibly show that these differences do not hold good, or that the Indo-Chinese individuals belong to this subspecies, the Malayan specimens to the preceding.

Hab. Hongkong, 1 ♂ in coll. Charles Oberthür (*type*).

LXVI. POLIODES gen. nov.—Typus : *roseicornis.*

♂♀. Tongue very thin and weak. Genal process prominent, globose. Palpus very small, not visible from above, first segment very short, joint open, third segment not concealed. Antenna comparatively long, segments dilated dorso-laterally, compressed ventrally, grooves deep, proximal edge of groove raised, hence proximal surface of segment larger than distal surface ; ciliae shorter in ♀ than in ♂, the lateral expansions a little shorter, and the segments ventrally less compressed, otherwise the antennae of the sexes not essentially different. Tibiae *spinose*, hindtibia with few spines ; spurs short, *one* pair to hindtibia ; first segment of hindtarsus *half* the length of the tibia, *not* longer than segments 1 and 2 together ; claws large, paronychium present, but ventral lobe absent, pulvillus reduced, small and narrow. Abdominal tergites spinose all over. Distal margin of forewing scalloped ; D^3 of hindwing not or little shorter than D^2, at least twice as long as D^4, SC^2 and R^1 not or very shortly stalked. Clasper and eighth tergite without friction-scales.

Early stages not known.

Hab. British East Africa.

One species.

242. **Poliodes roseicornis** spec. nov. (Pl. 1. f. 7, ♂).

♂♀. Scaling of antenna pink. Upperside of head and thorax, and sides of breast smoky grey, mesothoracic tegula paler, rest of body greyish wood-brown.

Wings, *upperside.*——Forewing grey, disc palest ; a line crossing M at M^2, curved proximad in front ; an obtusely triangular patch at costal margin at end of cell, paler in middle, followed behind by some ochraceous scales ; a discal, strongly dentate line, almost parallel to outer margin, faintly convex, black ; hinder margin rather densely, rest of wing more sparsely, shaded with black scales ; a marginal patch R^3—M^1 black ; a patch at internal angle whitish grey ; basal area almost without black scales ; an inconspicuous grey line extends from apex obliquely

towards 80°.——Hindwing : dirty wood-brown, a trace of a thin postdiscal line and of a broader submarginal one, the latter more distinct behind, fringe black at ends of posterior veins.

Underside dirty wood-brown, markings inconspicuous.——Forewing : a brownish black subapical patch bordered distally by a grey line, this patch extended generally to internal margin, forming an ill-defined submarginal band, discal dentate line vestigial, a second line nearer cell very feebly marked, costal area beyond cell more or less obviously whitish grey.——Hindwing : a discal and a postdiscal dentate line, the former at apex of cell ; submarginal area clouded with black scales, costal and abdominal areas more or less whitish grey.

♂. Tenth abdominal tergite (Pl. XXV. f. 23) subtriangular, broadly rounded at the end ; sternite with a triangular mesial lobe (*Xr*). Clasper with a subdorsal patch of bristles on the inner surface, the bristles pointing proximad and dorsad ; apex of clasper rounded dorsally, less so ventrally ; harpe (Pl. XXXII. f. 19) nearly as in *Leucophlebia afra*, reaching almost end of clasper, with a ventral projection before the apex, which has the shape of a rounded lobe. Penis-sheath with a short conical tooth pointing laterad (Pl. XXX. f. 45).

♀. Rather larger than ♂ ; markings more pronounced.

Length of forewing : ♂, 23—24 mm. ; ♀, 30 mm.

Hab. Western side of Lnitpold Mountains, near Ikutha, British East Africa.

In the Tring Museum 9 ♂♂, 1 ♀. Also in other collections from the same locality.

LXVII. CERIDIA gen. nov.—Typus : *mira*.

Smerinthus, Felder (*non* Latreille, 1802), *Reise Novara, Lep.* t. 78 (1874).
Leucophlebia ?, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 57 (1875).

♂ ♀. Tongue reduced to two short lobes or tubercles. Palpus small, but visible from above, rough-scaled, second segment not much longer than broad (scaling included), joint open. (Antennae very different in the two species). Abdominal tergites spinose all over. Tibiae *spinose* ; foretibia very short, armed at end with long *thorn* and a short tooth, spur without distinct fringe ; spurs of mid- and hindtibia slender, one pair to hindtibia, longer spur not quite half the length of the first tarsal segment, this as long as segments 2 to 4 together ; pulvillus present, paronychium without ventral lobes. Distal margins of wings entire ; lower angle of cell of hindwing acute. Clasper and eighth tergite without friction-scales.

Early stages not known.

Hab. British East Africa and Abyssinia.

The two species differ considerably in several respects, and will probably come under different generic terms when better material of *heuglini* is at disposal. The two individuals of *heuglini*—the only ones known—are so badly preserved that we abstain from making a separate genus for their reception. The differential characters of *heuglini* and *mira* are given under the respective species.

Key to the species :

a. Patch of forewing trapeziform, sinuate behind ; antenna pectinated . . . . . 243. *C. mira*.
Patch of forewing triangular, not sinuate behind ; antenna not pectinated . . . . . 244. *C. heuglini*.

243. **Ceridia mira** spec. nov. (Pl. IX. f. 12, ♂ .

♂ ♀. Antennae of both sexes pectinate, the dorso-lateral processes not scaled, very long in ♂ (Pl. LX. f. 27. 28), about three times as long as the segment in ♀ ; each segment ventrally produced into a lobe which is widened at the end (side-view), the lobes separate, somewhat shorter in ♀ than in ♂. Foretibia (thorn excluded) little longer than broad, first tarsal segment at least three times the length of the tibia (thorn excl.). R^2 of hindwing in or before centre of cell ; D^2 curved ; D^3 oblique, about three times as long as D^1, which is very short ; SC^2 and R^1 stalked or not.

Body greyish cream-colour, abdomen somewhat clayish ; face, a middle streak from head to the first abdominal tergite, dilated on the latter, breast and anterior legs more or less burnt umber-brown.

Wings, *upperside*, greyish cream-colour, with a feeble shade of pink.—— Forewing : a thin, nearly straight, subbasal line a little nearer M^2 than base, almost at right angles to costa, three short lines between (SM^1) and internal margin, joined together in front, with the interspaces brownish, forming an inconspicuous patch midway between base and internal angle, preceded by a large costal area heavily bordered with burnt umber, except at costal margin : this area is sinuate behind, and bears nearly in middle a burnt umber-brown stigma ; the proximal edge of the patch is the antemedian line, while the inner and outer edges of the distal border are the two discal lines, the three lines at the internal margin being the posterior parts of the antemedian and discal lines ; a postdiscal line about 4 mm. from margin, curved distad behind, somewhat lunulate ; a rather broad pale mars-brown marginal band, almost extended to postdiscal line, except in front and behind, where the band is bordered by a whitish line, first partition of band deeper in colour, halfmoon-shaped.——Hindwing : an indistinct median band touching end of cell, somewhat S-shaped, a postdiscal line parallel to margin indistinct ; an indication of a marginal band between SC^2 and R^1.

Underside as above, but the subbasal line of the forewing absent, the proximal border-band of the costal area not marked, the stigma absent, the external border of the patch continued beyond M^2 and less sinuate behind M^1, the postdiscal line heavier, and the marginal area paler ; the discal band of the hindwing much more distinct, of the same colour as that of the forewing ; postdiscal line distinct.

♂. Tenth tergite (Pl. XXV. f. 21) slightly narrowed distad, obliquely sinuate at each side before end, the tip narrowed (Pl. XXV. f. 22, dorsal view) ; sternite triangular, obtuse. Clasper slender, feebly narrowed towards apex, which is rounded; harpe produced into a slender, slightly curved, pointed, ventro-distal process, which bears a transverse tooth before the end (Pl. XXXII. f. 20). Penis-sheath with a patch of minute teeth at end, duct armed with a belt of long teeth (Pl. XXX. f. 44).

♀. A little darker than ♂, wings rather more elongate, outer margin of forewing less convex, very feebly undulate. Vaginal plate small, feebly chitinised, without processes, anterior and lateral edge of orifice somewhat raised (Pl. XVIII. f. 12).

Hab. Western side of Luitpold Mts., near Ikutha, British East Africa.

Three ♂♂, one ♀ in the Tring Museum.

244. **Ceridia heuglini.**

**Smerinthus heuglini* Felder, *l.c.* t. 78. f. 2 (♂) (1874) (Abyssinia ;—Mus. Tring).
Leucophlebia ? heuglini (!), Boisduval, *l.c.* p. 57. n. 3 (1875).

Ambulyx ?? heuglini, Butler, *Trans. Zool. Soc. Lond.* ix. p. 582. n. 23 (1877) (hab. ?).
Leucophlebia ? heuglini, Kirby, *Cat. Lep. Het.* i. p. 704. n. 7 (1893) (Abyssinia).

♂. There is only one-third of an antenna left between the two specimens known of this species; it is *not pectinated*, but simply grooved as in ordinary ♂-antennae, and the compressed ventral parts are not narrowed to separate lobes. Foretibia longer than in the preceding; no mid- and hindlegs preserved. Forewing more elongate-triangular; D^2 of hindwing somewhat longer than D^3, this not twice the length of D^4, lower angle of cell more acute than in *mira*. Tenth tergite more rounded dilated, apex pointed. Clasper sole-shaped, narrowed to apex; harpe with a single spatulate process which bears before the end a short and rather high carina. Penis-sheath without armature.

♀. Not known.

Hab. Abyssinia (Heuglin).

Two ♂♂ ex coll. Felder in the Tring Museum, one of them the *type*.

LXVIII. ACANTHOSPHINX.—Typus: *güssfeldti*.

Ambulyx, Dewitz (*nec* Walker, 1856), *Mitth. Münch. Ent. Ver.* iii. p. 27 (1879).
Acanthosphinx Aurivillius, *Ent. Tidskr.* xii. p. 228 (1891) (type: *güssfeldti*).

♂♀. Head large, not much narrower than the mesothorax; tongue short. Antenna very stout in ♂, ventral outline of segments straight (side-view), penultimate segment much higher than long; sub-andromorphic in ♀. Palpus with open joint, smoothly scaled. Thorax and abdomen woolly; the tergites of abdomen without broad multidentate scales, underscales mostly spiniform, apical spines weak. Fore- and midtibia spinose, hindtibia without spines; mid- and hindtibia shorter than the respective first tarsal segments, these much longer than the other four segments together: spurs *very* long, not spinose, not very unequal, longer terminal one of hindtibia as long as the first tarsal segment; two pairs to hindtibia; pulvillus and paronychium present. Distal margin of wings entire; D^2 of hindwing very oblique, three times as long as D^3, lower angle of cell acute. Clasper and eighth tergite with organ of friction (Pl. LIX. f. 1).

Early stages not known.

Hab. West Africa: Sierra Leone to the Congo basin.

One species.

Differs from *Polyptychus* especially in the broader head, non-spinose hindtibia and the very long spurs.

245. Acanthosphinx güssfeldti.

**Ambulyx güssfeldti* Dewitz, *l.c.* iii. p. 27. t. 2. f. 1. 1a (♂) (1879) (Chinchoxo;—Mus. Berlin): Kirby, *Cat. Lep. Het.* i. p. 676. n. 27 (1892).
Acanthosphinx güssfeldti var. *gigas* Aurivillius, *l.c.* xii. p. 228. t. 1. f. 1 (♀) (1891); id., *l.c.* xiii. p. 182. n. 229 (1892) (Cameroons, ♂♀; spec. dist.?).

♂♀. The species varies a good deal in size.

♂. Tenth tergite broad (Pl. XXIV. f. 24), sinuate at the end, concave beneath, curved ventrad at end; sternite narrowed to a strongly chitinised hook (Pl. XXIII. f. 16, 17). Clasper large, with a large patch of small friction-scales which occupy the greater part of the surface; dorsal and apical edges of clasper without fringe of long scales (compare *Polyptychus trisecta*, *orthographus*, etc.), the

corresponding organ of the eighth tergite consisting of a ribbon of scales which are soldered together at the edges ; the ribbon extends all round the lateral and apical edge of the segment (Pl. LIX. f. 1), not being interrupted mesially, as is the case in *Polyptychus*, *Protambulyx*, etc. ; it is visible in the specimens without dissection ; harpe complicated (Pl. XL. f. 6) ; a dorsal process rod-shaped, densely beset with very short bristles which point basad ; a mesial flap lies flat upon the clasper, is somewhat horn-shaped and also rough with short bristles ; a submesial ridge is the highest part of the harpe ; the distal process is separated from the clasper at the end ; the ventral ridge curves dorsad, being continuous with the ridge which forms the dorsal process. The penis-sheath (Pl. XXX. f. 24) has a long apical process, like many species of *Polyptychus*.

♀. Not dissected.

Hab. West Africa : Sierra Leone to the Congo basin.

In the Tring Museum 2 ♂♂ from Sierra Leone.

LXIX. LOPHOSTETHUS.—Typus : *demolini*.

Sphinx, Angas (*non* Linné, 1758), *Kaff. Illustr.* (1849).
Smerinthus, Walker (*non* Latreille, 1802), *List Lep. Ins. B. M.* viii. p. 250. n. 12 (1856).
Enclea Boisduval (*non* Hübner, 1822), *Spec. Gén. Lép. Hét.* i. p. 14 (1875).
Lophostethus Butler, *Trans. Zool. Soc. Lond.* ix. p. 585 (1877) (type : *demolini*).

♂♀. Tongue short and weak. Palpus small and slender, third segment conical, prominent, acutely pointed. Antenna slender, prismatical in ♂, subprismatical in ♀, the seriated ciliae in ♀ short, but obvious, end-segment short. Tibiae *spinose* ; foretibia armed with a long terminal thorn ; two pairs of spurs to hindtibia, long terminal one more than half the length of the first tarsal segment, this as long as the tibia, rather longer than the other segments together ; pulvillus *absent* ; paronychium with only one lobe on each side. Abdominal tergites with spinules only at the apices, underscales bi- and tridentate. Distal margin of forewing scalloped ; D^2 of hindwing more than twice the length of D^3, very obliqne ; SC^2 and R^1 on a short stalk or from angle of cell ; frenulum and retinaculum present.

♂. Tenth abdominal tergite broad (Pl. XXIV. f. 23), concave below, the margins being bent downward, apex rounded, entire or sinuate ; sternite with a broad triangular mesial lobe. Clasper broad, apex rounded, distal third incrassate but not strongly chitinised, rugate on the inner surface ; harpe (Pl. XXXIII. f. 13) longitudinal, dentate at end ; no patch of friction-scales on outer surface of clasper. Penis-sheath compressed at end, carinate, without hooks or teeth.

♀. Eighth tergite of abdomen rounded-truncate, scaled. Vaginal plate (Pl. XVII. f. 12) membranaceous proximally of the orifice, without antevaginal ridge or lobe, postvaginal portion of plate strongly chitinised, transverse, posterior edge very broadly rounded.

Larva with belts of dentate spikes, head large and rounded, horn spinose, black like the spikes.—Food-plant : *Hibiscus tiliaceus*.

Chrysalis : tongue-case shorter than forelegs ; cremaster broad, obtuse.

Hab. Continental Africa south of the Sahara.

One species.

246. Lophostethus demolini.

"Smérinthe Dumolin" Latreille, in Cuv., *Règne Anim.* iii. t. 20. f. 1 (1830) (Sénégal).
Sphinx demolini Angas, *l.c.* t. 30. f. 11 (1849) (Natal).
Lophostethus demolini, Butler, *Trans. Zool. Soc. Lond.* ix. p. 585 (1877).

The species was first figured by Latreille, *l.c.*, but only under a French designation. All the names on that plate are French, not Latin. These designations are: Castnie Hübner, Aegocère Boisduval, Coronis d'Urville. As a matter of course, these names have no standing. To our knowledge Angas was the first to give the insect a scientific name. Boisduval says that he himself had figured the species as a *Smerinthus* in Latreille, *Familles Naturelles*, but we cannot find the plate there; perhaps he meant the *Règne Animal* cited above.

Hab. Aethiopian Region except the Malagassic Subregion.

Two subspecies:

a. L. demolini carteri.

Latreille, *l.c.*
Smerinthus demolini, Walker, *List Lep. Het. B. M.* viii. p. 250. n. 12 (1856) (partim; syn.); Dewitz, *Mitth. Münch. Ent. Ver.* iii. p. 27 (1879) (Chinchoxo).
Euclea demolini, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 15. n. 1 (1875) (Galam: larva alia spec.).
Lophostethus demolini, Butler, *l.c.* (partim).
Lophostethus dumolini, Kirby, *Cat. Lep. Het.* i. p. 705. n. 1 (1892) (partim); Druce, in Moloney, *West Afr. Forestry* p. 493. n. 10 (1887).
Lophostethus carteri Rothschild, Nov. Zool. i. p. 97 (1894) (Lagos).

♂ ♀. The characters by which *carteri* was said to be distinguished from the Eastern *demolini* prove on receipt of more material to be more or less variable, so that no absolute reliance can be placed upon them. The West African individuals are darker in ground-colour than the Eastern ones: the black, triangular, submarginal patch R^2—M^1 of the upperside of the forewing is shorter, the two small submarginal patches M^1—(SM^1) are absent or faint, the antemedian and the discal lines are on the whole farther apart at (SM^1) and the black postmedian costal patch of the underside is smaller, not extending beyond R^1. Tenth tergite broader than in *demolini demolini*.

Hab. West Africa: Senegal to the Congo.

In the Tring Museum 3 ♂♂, 1 ♀ from Sierra Leone (Mitford; Stevens, in August); Lagos; Congo.

b. L. demolini demolini.

Sphinx demolini Angas, *l.c.*
Smerinthus dumolini, Walker, *l.c.* (Natal; syn. excl.).
Euclea dumolini, Boisduval, *l.c.* (partim; Natal).
Lophostethus demolini, Butler, *l.c.* (partim, syn. excl.).
Lophostethus dumolini, Kirby, *l.c.* (partim); Meld., in Weism., *Stud. Theory Descent* ii. p. 527 (1882) (descr. of larva); Fawc., *Trans. Zool. Soc. Lond.* xv. p. 307. n. 9. t. 48. f. 7. 8 (*l., p.*) (1901).

♂ ♀. The tenth tergite of the ♂ varies somewhat individually. It is sinuate with the lobes pointed in a specimen from Uganda in the Tring Museum (Kamnanura, Bulamwezi); this individual represents possibly a third geographical race, but it is too much rubbed to allow description; the wings have apparently been nearly as dark as in *carteri*.

The early stages of the caterpillar should be studied. We assume that the young larva has a triangular head.

Hab. Natal northward to Uganda.

In the Tring Museum 1 larva, 7 ♂♂, 5 ♀♀ from : Natal ; Kionga, south of Rovima R. (Reimer) ; Kamuanura, Bulamwezi, Uganda, 29. iii. 1897 (Dr. Ansorge).

LXX. LANGIA.—Typus : *zenzeroides*.

Langia Moore, *Proc. Zool. Soc. Lond.* p. 567 (1872) (type : *zenzeroides*).
Langia (!), Kirby, *Cat. Lep. Het.* i. p. 705 (1892).

♂ ♀. Tongue reaching end of forecoxa ; pilifer with a brush of scales instead of bristles ; genal process broad. Palpus just visible in dorsal view, not essentially different in the sexes, with long hairs laterally. Antenna of ♂ compressed, not strongly grooved, slightly dilated above the grooves, hence outline undulate in a dorsal view, distal segments much higher than long, but only slightly compressed ; of ♀ very feebly compressed, seriated ciliae short ; end-segment very short and obtuse in both sexes. Body roughly scaled, excepting head, pro-mesonotum and end of abdomen ; the scales gradually widened towards ends, dentate ; *no* spines on abdomen. Tibiae *not* spinose ; spurs long, two pairs to hindtibia, with long naked points ; tarsi short, lateral apical spines strong, outer spines of soles more or less erect and inclining mesiad ; claws and pulvillus large, paronychium with *one* broad lobe at each side. Distal margin of forewing dentate ; D^2 of hindwing curved, sending a long spur into cell, R^2 below centre of cell ; frenulum and retinaculum present. *No* organ of friction on clasper.

Larva granulose, the granules pointed, white, a dorso-lateral series of higher granules from pronotum to horn, situated upon a white line ; head very strongly narrowed above, very high, impressed behind, frons not granulose ; horn very short. —Food-plant : wild cherry.

Pupa very stout and short ; rounded at both ends, without cremaster ; head without projections, tongue-case longer than that of the second leg, reaching to the wing-cases, but not in between these ; tergites rough with granules, the granules sparse on the sternites ; wing-cases short.

Hab. North India to Japan.

One species.

247. Langia zenzeroides.

Langia zenzeroides Moore, *l.c.* (type : where ?).

♂ ♀. The grey, brown, and black colour of this species reminds one very much of Cossids. It is, however, not a case of mimicry, but the similarity is due to this Sphinx as well as the Cossids being adapted in colour to the bark of trees. There is some individual and geographical variation both in colour and structure.

♂. Tenth abdominal tergite bilobate (Pl. XXIV. f. 25. 26) ; sternite broadly divided into two processes. Clasper long, narrowed to apex, dorsally reduced in width, hence a wide gap between it and the supra-anal plate, ventro-apical margin turned inward ; harpe produced into a long, horizontal, ventral process which is sinuate and lobate at the end ; the process is visible without dissection (Pl. XXXIII. f. 14. 15). Penis-sheath irregularly compressed (Pl. XXX. f. 48), very stout, armed at the end with a long strong hook which curves ventrad.

♀. Anterior part of the vaginal plate strongly chitinised, raised into a transverse

ridge in front of the large vaginal cavity ; postvaginal part of plate also projecting distad, rounded, more or less membranaceous, except at the edge.

Early stages see above.

Hab. North India to Japan.

Two subspecies :

a. L. zenzeroides zenzeroides.

Langia zenzeroides Moore, *l.c.* (Kotghur, N.W. Ind.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 585. n. 1 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 25. n. 134 (1887) (Simla ; Sikhim) ; Kirby, *Cat. Lep. Het.* i. p. 705. n. 1 (1892) ; Hamps., in Blanf. *Fauna Brit. Ind., Moths* i. p. 73. n. 99. fig. 45 (♂ + ♀) (1892) (Simla ; Dharmsala ; Sikhim ; Khasis) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 407. n. 98 (1898) (Sikhim, 5000 ft., iv. ; Elwes : *l.* at Kurseong about vii. on wild cherry).

**Langia khasiana* Moore, *l.c.* 568 (1872) (Khasia Hill ;—Mus. Brit.) ; Butl., *l.c.* n. 2 (1877) ; Cot. & Swinh., *l.c.* n. 135 (1887).

Langia zenzeroides (!), Gott, *Ent. Mo. Mag.* xiv. p. 116 (1877) (larva hissing, on apricot ; imago squeaking).

Langia zenzeroides ab. *khasiana*, Rothschild, Nov. Zool. i. p. 98 (1894).

♂ ♀. The individuals from Assam are on the whole a little more buffish than those from Sikhim and N.W. India, but the difference is very slight and not constant. The harpe is individually variable, apparently more often bisinuate (Pl. XXXIII. f. 14. 15) in Assam than in Sikhim specimens ; compare figs. 14 (Sikhim), 15 (Assam, *type* of *khasiana*).

♀. Edge of ridge in front of vaginal orifice slightly undulate.

Hab. North-West India, Sikhim, Assam ; South China.

In the Tring Museum 6 ♂♂, 1 ♀ from : Sikhim ; Khasia Hills.

In coll. Charles Oberthür from Yunnan.

b. L. zenzeroides nawai subsp. nov.

♀. *Upperside.*——Forewing : white streak in cell broad, white scaling on disc more extended than in the preceding ; first discal line vestigial between R^2 and M^2, appearing broadly interrupted, second vestigial, not marked between M^1 and (SM^1), third interrupted between M^2 and SM^2.——Hindwing : lines at anal angle shorter than in the preceding subspecies.

Underside : marginal bars of hindwing and the upper marginal ones of forewing more curved than in the Indian representative.

Antevaginal plate with a broad triangular mesial sinus, the sides angulate.

Hab. Lake Biwa, Hondo, Japan.

In the Tring Museum 2 ♀♀ (collected by Yiomachi Nawa).

LXXI. RHODOPRASINA gen. nov.—Typus : *floralis*.

Ambulyx, Butler (*non* Walker, 1856), *Trans. Zool. Soc. Lond.* ix. p. 639 (1877).

Triptogon, id. (*non* Boisduval, 1875), *Illust. Typ. Spec. Lep. Het. B. M.* v. p. 13 (1881).

Maruamba (?), Kirby, *Cat. Lep. Het.* i. p. 708 (1891).

Cypa, Hampson (*non* Walker, 1864), in Blanf., *Fauna Brit. Ind., Moths* i. p. 72 (1892).

♂ ♀. Tongue very short and weak. Palpus very small, closely appressed to the head. This crested between the antennae. Lower half of eye covered by a tuft of long hair-scales (Pl. LIX. f. 12). Antenna of ♀ simple, cylindrical, without seriated prolonged ciliae ; of ♂ peculiar (Pl. LX. f. 22), the side-grooves deep,

extending all round the ventral side of the segment, the basal and apical edges of each segment produced ventrad as shown in figure, this projection widened laterad near end, appearing spatulate in a ventral view. Tibiae with very *few spines* at the end ; anterior tibia ending in a long naked *thorn* ; spurs of mid- and hindtibia very short, *one* pair to hindtibia : pulvillus and paronychium present. Cell of hindwing broad, lower angle not acute, about 90°, R^2 from centre of cell, stalk of SC^2 and R^1 rather short. Distal margin of forewing dentate. Scales of abdominal tergites long, no broad underscales, apical spines weak.

♂. Tenth tergite (Pl. XXV. f. 1. 24) broad, flat, sinnate, the two lobes pointed, their tips curved downward ; tenth sternite very broad and short, transverse, the edge incrassate, rounded. Clasper without friction-scales, apical half narrower than basal half, also less chitinised ; harpe nearly concealed in the deep cavity of the clasper (Pl. XL. f. 9) ; it ends in two strong, long, conical processes which point upwards. Penis-sheath (Pl. XXX. f. 30) armed with a small, subapical, denticulate, transverse ridge which is higher at the left side : penis-funnel (P-F) on each side with a curved, pointed, flattened process.

♀. Not dissected.

Early stages unknown.

Hab. North India.

One species.

248. Rhodoprasina floralis.

**Ambulyx floralis* Butler, *Trans. Zool. Soc. Lond.* ix. p. 639 (1877) (Darjiling ;—♂ ♀ in coll. Atkinson, now in coll. Staudinger) ; Moore, *Descr. Ind. Lep. Atk.* p. 6 (1879).

Triptogon floralis, Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 13. t. 81. f. 1 (♀) (1881) (Darjiling) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 25. n. 138 (1887) (Darjiling).

Marumba (?) *floralis*, Kirby, *l.c.* p. 708. n. 28 (1891) (Darjiling).

Cypa floralis, Hampson, *l.c.* p. 72. n. 96 (1892) (Sikhim) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 407. n. 96 (1898) ("not seen").

♂♀. Anal angle of forewing produced backwards as a broad lobe. The hindwing has three straight oblique lines on the underside ; they are equidistant, the first being subbasal. The presence of this subbasal line is very remarkable, inasmuch as there is no such line in any other Ambulicine species, the most proximal line of the other *Ambulicinae* standing always distally of the base of M^2. The red colour of the basal half of the underside of the forewing, and of the upperside of the hindwing, illustrates conspicuously the peculiar phenomenon so widely occurring among Lepidoptera that the *upperside* of the hindwing resembles in colour the *underside* of the forewing as regards the basal areas of both wings.

Hab. Sikhim.

The species is rare. We received from Mons. Charles Oberthür a ♂ labelled Darjiling, forêt, 13. iv. 1882 (A. Desgodins). The insect is apparently an early one, and that may partly account for its scarcity in collections. It is possible that one may succeed in attracting specimens by a lamp after midnight, many *Ambulicinae* occurring only very late in the night.

In coll. Charles Oberthür 2 ♀♀.

In the British Museum 2 ♀♀ ; in coll. Staudinger 1 ♂ (*type*), 1 ♀, ex coll. Atkinson ; also in the Berlin Museum, in the coll. of Col. Swinhoe, and in the Indian Museum at Calcutta.

LXXII. CLANIDOPSIS gen. nov.—Typus : *exusta*.

Basiana, Butler (*non* Walker, 1856), *Proc. Zool. Soc. Lond.* p. 252 (1875).
Clanis, Cotes & Swinhoe (*non* Hübner, 1822), *Cat. Moths Ind.* i. p. 29 (1887).
Ambulyx, Hampson (*non* Walker, 1856), in Blanf., *Fauna Brit. Ind., Moths* i. p. 80 (1892).

♂. Tongue very short and weak. Palpus rather stout in ♂. Antenna thin, somewhat setiform, in ♂ prismatical, transsection triangular ; in ♀ cylindrical, with the seriated ciliae rudimentary. Tibiae *not* spinose ; hindtibia with two pairs of spurs, long end-spur about as long as the second hindtarsal segment ; pulvillus and paronychium *absent*. Abdominal tergites with spiniform underscales besides larger ones, the spines at the apical edges very numerous.

♂. Tenth tergite broad, sides slanting towards apex, the latter sinuate, with the lobes obtuse (Pl. XXIV. f. 21) ; sternite with a broad, triangular, mesial lobe, which is somewhat constricted at the base. Clasper (Pl. XXXIII. f. 8) sole-shaped, without friction-scales, apical half of internal surface hairy, the hairs pointing proximad, basal half smooth, deeper concave ; harpe represented by a rather weak mesial fold, which is longitudinal in position, ending in a flat spatulate process which curves ventrad ; there is no subdorsal basal tuberculated lobe as in *Clanis*. Penis-sheath weak, without armature.

♀ not dissected.

Early stages not described ; larva on poplar.

Hab. N.W. India.

One species.

Easily distinguished from *Clanis* by the absence of spines from the tibiae and the absence of the pulvillus and paronychium, besides the much shorter tongue.

249. Clanidopsis exusta.

**Basiana exusta* Butler, *l.c.* n. 37 (1875) (Kunawur ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix p. 595. n. 3. t. 93. f. 4. (1877) (Kunawur) ; Kirby, *Cat. Lep. Het.* i. p. 703. n. 10 (1892) (Kunawur).
Clanis exusta, Butler, *Proc. Zool. Soc. Lond.* p. 154. n. 35 (1883) (Solun, vii.); Cot. & Swinh., *l.c.* p. 29. n. 162 (1887) (Simla) ; Swinh., *Cat. Lep. Het. Ox.* i. p. 29 n. 115 (1892) ("India").
Ambulyx exusta, Hampson, *l.c.* i. p. 80. n. 113 (1892) (N.W. Him.).

♂♀. The insect resembles very much the species of *Clanis* in colour and pattern. As in *Clanis phalaris* there is no black streak behind the cell on the underside of forewing, nor a black basal patch on the upperside of the hindwing, but the latter wing has at least one distinct line in the outer half. The mid- and hindtibiae are greyish white on the upperside.

Hab. N.W. India.

In the Tring Museum 7 ♂♂ from : Dalhousie ; Chumba ; Kulu.

♀♀ in the British Museum and coll. Swinhoe.

LXXIII. AGNOSIA. gen. nov.—Typus : *orneus*.

Sphinx, Westwood (*non* Linné, 1758), *Cab. Or. Ent.* p. 13 (1848).
Smerinthus, Walker (*non* Latreille, 1805), *List Lep. Ins. B. M.* viii. p. 253 (1856).
Basiana, Butler (*non* Walker, 1856), *Trans. Zool. Soc. Lond.* ix. p. 596 (1877).
Clanis, id. (*non* Hübner, 1822), *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 14 (1881).
Ambulyx, Hampson (*non* Walker, 1858), in Blanf., *Fauna Brit. Ind., Moths* i. p. 29 (1892).

♂ ♀. Tongue short. Joint of palpus open. Antenna of ♂ deeply grooved, strongly compressed, ciliae long ; in ♀ almost cylindrical, feebly grooved, basal fasciculated ciliae slightly prolonged. Tibiae *not* spinose ; foretibia with apical thorn, shorter than first tarsal segment (thorn excl.) ; spurs short, *one* pair to hindtibia ; pulvillus and paronychium *present*. Abdomen with spines all over the tergites, the spines denser at the apical margins. Distal margin of forewing entire. No friction-organ in ♂.

Early stages not known.

Hab. From N.W. India to Ceylon.

One species.

Differs from *Clanis* and *Polyptychus* in the proximal pair of spurs being absent from the hindtibia, and in the tibiae not being spinose ; from *Laothoë* in the even distal margin of the forewing and the non-spinose tibiae.

250. Agnosia orneus.

**Sphinx orneus* Westwood, *Cab. Or. Ent.* p. 13. f. 16. f. 3 (1848) (♂, Central India ;—Mus. Oxford).
**Smerinthus pudorinus* Walker, *List Lep. Ins. B. M.* viii. p. 253. n. 16 (1856) (♂ ♀, N. India ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 46. n. 37 (1875) (Centr. India).
Basiana pudorina, Butler, *Trans. Zool. Soc. Lond.* ix. p. 596. n. 7 (1877) (N. India).
Clanis pudorina, id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 14. t. 81. f. 3 (♂) (1881) (Almorah) : Cot. & Swinh., *Cat. Moths Ind.* i. p. 29. n. 161 (1887) (Almorah).
Basiana orneus, Kirby, *Cat. Lep. Het.* i. p. 703. n. 11 (1892) (N. India).
Ambulyx orneus, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 80. n. 114 (1892) (Almorah ; Centr. India).

Westwood describes the foretibia as being "terminated by a strong, curved, horny spine." This peculiar character has not been noticed by Walker, Boisduval, Butler, Hampson.

♂ ♀. Tenth tergite elongate-spatulate, apex somewhat truncate ; ninth tergite with long hair-scales (Pl. XXIV. f. 13). Clasper sole-shaped (Pl. XXXIII. f. 9), without friction-patch ; harpe with three hooks, nearly equidistant, one distal, the other two from the upper edge ; a convex patch of short bristles above the harpe. Penis-sheath (Pl. XXX. f. 49) without armature, but the penis-funnel (p-f) produced into a broad lobe which is covered with minute spines.

♀. Not dissected.

Early stages not known.

Hab. North-West India to Ceylon.

Three specimens in the British Museum ; one of them, from Haragam, near Kandy, Ceylon, is larger than the others. Several specimens in the Oxford Museum ; one in the Tring Museum.

LXXIV. PARUM gen. nov.—Typus : *colligata*.

Daphnusa Walker, *List Lep. Ins. B. M.* viii. p. 238 (1856) (partim ; type : *ocellaris*)
Metagastes, Oberthür (*non* Boisduval, 1875), *Et. Ent.* xi. p. 29 (1886).

♂ ♀. Tongue short and weak, with mesial fringe. Pilifer with bristles. Transverse carina of labrum long. Palpus larger in ♂ than in ♀, second segment smoothly scaled, joint not distinctly open. Tibiae *without* spines ; spurs very short, two or one pair to hindtibia ; pulvillus and paronychium present, the latter with

two small lobes at each side. SC^2 and R^1 of hindwing not stalked, or the stalk very short; R^2 in or a little below centre of cell, D^2 straight or very slightly curved; distal margin of wings entire; apex of forewing obtuse, almost rounded-truncate. Distal segments of antenna not much higher than long (Pl. LX. f. 8); seriated ciliae of ♀ prolonged. No friction-scales on clasper.

Early stages not known.

Hab. North India to Japan.

Two species.

The species of *Parum* have hitherto been considered generically identical with *Daphnusa ocellaris*. However, they stand farther apart from *ocellaris* than this does from *Polyptychus* and *Marumba* in structure as well as in pattern, and no doubt can be entertained about their being generically distinct from *Daphnusa*. There is even justification for erecting a genus for each of the two, as will be seen from the structural differences pointed out below. Both species are very interesting on account of the state of development of the retinaculum and the hindtibial spurs. In *porphyria* the proximal pair of spurs of the hindtibia is definitely lost, while in *colligata* it is absent from some individuals and present in others, in the latter case these spurs being very small and mostly concealed under the scaling. The retinaculum and frenulum are well developed in *porphyria*, while in *colligata* the retinaculum is vestigial (♂) and the frenulum shortened. We have here an instance of one species being more generalised than the other in one character and more specialised in another. There are no older and younger species; there are older and younger characters.

Key to the species:

Hindwing below with black (longitudinal) streak on disc . . . . . 251. *P. colligata*.

Hindwing below without black (longitudinal) streak on disc . . . . . 252. *P. porphyria*.

251. Parum colligata.

**Daphnusa colligata* Walker, *List Lep. Ins. B. M.* viii. p. 238. n. 2 (1856) (N. China;—Mus. Brit.); Boisd., *Spec. Gen. Lep. Het.* i. p. 52. n. 2 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 594. n. 3 (1877) (N. China; Hongkong); Leech, *Proc. Zool. Soc. Lond.* p. 587. n. 27 (1888) (Japan; Kiukiang; = *bieti*); id., *Trans. Ent. Soc. Lond.* p. 119. n. 96 (1889) (Kiukiang; = *Metagastes bieti*); Kirby, *Cat. Lep. Het.* i. p. 704. n. 3 (1892) (China; Thibet); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 28. n. 12 (1892) (N. China); Leech, *l.c.* p. 279. n. 41 (1898) (Ichang; Kiukiang, vii.).

**Metagastes bieti* Oberthür, *Et. Ent.* xi. p. 29. t. 1. f. 2 (1886) (Ta-tsien-lu;—Coll. Oberthür).

♂. Pilifer short. Retinaculum occasionally vestigial, frenulum shortened; proximal pair of hindtibial spurs sometimes present; unsettled in these characters. Abdomen without large underscales; spines at the edges of the tergites weak. Tenth tergite curved downward, compressed at the curvature, apical edge transverse, sharp, angles rounded (Pl. XXIV. f. 11), upper surface carinate distally; sternite represented by a low transverse ridge, which is feebly sinuate mesially and rough with minute pointed granules. Clasper sole-shaped, rounded apically, hairy on the inner surface; distal part of harpe (Pl. XXXIII. f. 12) forming a strongly chitinised ventral ridge, which is longitudinal, slightly bent dorsad, granulose, with the ventral surface slightly concave and the dorsal side convex. Apical edge of penis-sheath (Pl. XXX. f. 46) bent proximad at the right and left side. End of antenna see Pl. XL. f. 8.

♀. Not dissected. Deeper in tint than ♂, black markings more prominent.

Hab. Central, Eastern, and North China ; Japan.

In the Tring Museum 4 ♂♂ from Kiushiu, and Gifu (Y. Nawa), and between Shanghai and Kiukiang.

252. Parum porphyria.

**Daphnusa porphyria* Butler, *Trans. Zool. Soc.* ix. p. 640 (1877) (Darjiling ;—coll. Atkinson, now coll. Staudinger) ; Moore, *Descr. Lep. Atk.* p. 7 (1879) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 27. n. 152 (1887) (Darjiling) ; Kirby, *Cat. Lep. Het.* i. p. 704. n. 4 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 73. n. 98. fig. 44 (♂) (1892) (Sikhim) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 407. n. 98 (1898) (Sikhim, 1800 ft., Balasun valley, at light).

♂♀. Head with high broad crest of scales. Antenna thinner than in *colligata*, palpus larger. Pilifer prolonged, resembling a tooth-brush (Pl. LXII. f. 5). Retinaculum and frenulum normal. Proximal pair of spurs absent from hindtibia. Abdominal tergites with the underscales mostly long spiniform, but very weak, spines at the edges also prolonged, not strong, scarcely different from pointed scales. Tenth abdominal tergite long, slender, triangular, gradually narrowing to a point and curving downwards (Pl. XXIV. f. 12) ; sternite similar to that of *colligata*, but without granules. Clasper as in *colligata* ; harpe pointed distad, slightly curved mesiad, surface somewhat concave, edge irregularly sinuate (Pl. XXXIII. f. 11). Penis-sheath (Pl. XXX. f. 47) with the apical edge bent proximad and produced into a denticulated lobe on one side.

♀. Eighth abdominal tergite mesially less strongly chitinised than at the sides. Vaginal plate without special armature, lateral edges of orifice somewhat raised (Pl. XVII. f. 4).

Hab. North India : Sikhim.

In the Tring Museum 1 ♂, 2 ♀♀ from Sikhim (Mandelli), ex coll. Felder.

LXXV. CYPA.—Types : *decolor*.

Smerinthus, Walker (*non* Latreille, 1802), *List Lep. Ins. B. M.* viii. p. 255 (1856).
Cypa id., *l.c.* xxxi. p. 41 (1864).

♂♀. Tongue very short and weak, fringe long, upper surface with tubercles. Pilifer short, with a large brush of scales ; genal process short, broad. Head small, crested : eye small, lashed. Palpus closely appressed to frons, not projecting, small. Antenna with long end-segment, which bears several bristles at and near tip, three preceding segments small, short, rhombiform in side-view ; ♂ : strongly compressed, ciliae long ; ♀ : cylindrical, ciliae not prolonged. Abdominal tergites with weak spines at the edges. Tibiae *not* spinose ; spurs minute (black), two pairs to hindtibia ; pulvillus and paronychium present, this with two slender lobes at each side. Distal margin of forewing irregularly lobed or at least not even ; R^2 of hindwing below centre of cell ; SC^2 and R^1 on a long stalk ; D^2 and D^3 straight, upper angle of cell 90°, lower angle obtuse ; costal margin of hindwing straight. Clasper without friction-scales.

Early stages not known.

Hab. India.

One species.

The long end-segment of the antenna is a very remarkable character, with which we meet in this subfamily only in *Protambulyx* and *Oxyambulyx*. Kirby put this genus among his *Macroglossinae*. The species remind one indeed very much of *Gurelca*.

253. Cypa decolor.

**Smerinthus decolor* Walker, *l.c.* viii. p. 255. n. 19 (1856) (Hindostan ;—Mus. Oxford).

♂ ♀. There are two subspecies, which differ in the outline of the forewing. The *Smerinthus decolor* of Schaufuss, *Nunq. Otios.* p. 14 (1871), generally quoted under the present species, is doubtless an *Oxyambulyx*, most likely *subocellata* ♀, wrongly identified by Kaden as the *decolor* of the B. M. (British Museum).

♂. Tenth tergite (Pl. XXIV. f. 20) suddenly narrowed beyond basal fourth, slender, obtusely pointed ; no sternite. Clasper (Pl. XXXIII. f. 7) elongate, triangular, apex obtuse, almost truncate ; a dorso-basal flat process (*pdb*) ; harpe with two processes, one basal, slender, rod-like, clubbed, apex denticulated, the other more distal, triangular, directed dorso-distal, reaching dorsal margin of clasper, the dorsal part of the inner surface of the clasper proximally of this process convex, below this convex part an oblique fold. Penis-sheath (Pl. XXX. f. 32) armed at end with a horizontal slender process.

♀. Eighth tergite (Pl. XVII. f. 10) peculiar: mesially grooved, the groove widened at the end of the plate, very narrow in proximal two-thirds, the edges of the apical cavity irregularly and minutely notched ; proximally of this groove there is a hole, most likely the orifice of a gland, the groove having the appearance of serving as a channel for bringing the fluid of the supposed gland to the apical cavity. Vaginal plate (Pl. XVII. f. 9. 11) with the antevaginal part short, not strongly chitinised ; postvaginal part a large triangular, rounded-truncate plate.

Early stages not known.

Hab. North India to Tenasserim and Ceylon ; New Guinea.

a. C. decolor decolor.

**Smerinthus decolor* Walker, *l.c.* (Hindostan ;—Mus. Oxford).

Mimas decolor, Butler, *Trans. Zool. Soc. Lond.* ix. p. 583. n. 3 (1877) (Darjiling) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 24. n. 131 (1887) (Darjiling ; Tavoy, this spec. ?).

**Cypa incongruens* Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* v. 12. t. 80. f. 8. 9 (1881) (Darjiling ;—Mus. Brit.) ; Cot. & Swinh., *l.c.* p. 13. n. 77 (1887) (Sikhim).

Cypa decolor, Moore, *Journ. As. Soc. Bengal* lv. 2. p. 97. n. 1 (1886) (Ponsokai, Siam) ; Swinh., *Trans. Ent. Soc. Lond.* p. 164. n. 19 (1890) (Tavoy) : Kirby, *Cat. Lep. Het.* i. p. 640. n. 2 (1892) ; Hamps., in Blanf , *Fauna Brit. Ind., Moths* i. p. 71. n. 94. fig. 43 (♂) (1892) (Sikhim; Tavoy) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 26. n. 101 (1892) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 407. n. 94 (1898) (Sikhim, 4500 ft., ix.).

♂ ♀. Distal margin of forewing irregular, prominently lobed at R^3. Vaginal plate see Pl. XVII. f. 9.

Hab. North India to Shan States.

In the Tring Museum 2 ♂♂, 6 ♀♀ from Sikhim.

b. C. decolor ferruginea.

**Cypa ferruginea* Walker, *l.c.* xxxi. p. 42 (1864) (Ceylon ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 53 (1875) (Ceylon) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 554 (1877) ; Moore, *Lep. Ceylon* ii. p. 8. t. 79. f. 3 (♀) (1882) ; Cot. & Swinh., *l.c.* p. 14. n. 78 (1887) (Ceylon) ; Kirby, *l.c.* n. 1 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 72. n. 95 (1892).

♀. Distal margin of forewing convex in middle, not lobed
Moore's figure of the specimen is coarse.
Hab. Ceylon.
Only 1 ♀ (*type*) known, in the British Museum.

c. C. decolor euroa subsp. nov

♀. Larger than the Indian forms, broader winged, more clayish, head and thorax somewhat olivaceous, lobe R^3 of forewing less prominent than in *dec. decolor*, Vaginal plate (Pl. XVII. f. 11) much broader distally.
Hab. Milne Bay, Brit. New Guinea.
One ♀ in the Tring Museum, Dec. 1898 (A. S. Meek).

LXXVI. SMERINTHULUS.—Typus : *quadripunctatus.*

Smerinthus, Moore (*non* Latreille, 1802), *Proc. Zool. Soc. Lond.* p. 568 (1872).
Mimas, Butler (*non* Hübner, 1822), *ibid.* p. 310 (1876).
Triptogon, id. (*non* Boisduval, 1875), *Trans. Zool. Soc. Lond.* ix. p. 588 (1877) (partim).
Maramba, Kirby (*non* Moore, 1882), *Cat. Lep. Het.* i. p. 707 (1892).
Dilina, id. (*non* Dalman, 1816), *l.c.* p. 709 (1892).
Cypa, Hampson (*non* Walker, 1864), in Blanf., *Fauna Brit. Ind., Moths* i. p. 71 (1892).
Smerinthulus Huwe, *Berl. Ent. Zeitschr.* xl. p. 370 (1895) (type : *quadripunctatus*).

♂♀. Differs from *Cypa* in the following characters : tongue not tuberculose near base. Pilifer vestigial, with few scales or bristles, or naked. End-segment of antenna short, triangular in side-view, penultimate segment longer than in *Cypa*, antennae of ♀ with prolonged ciliae ; eighth tergite of ♂ with a brush of prolonged scales at the sides and at end, appearing trilobate. Penis-sheath without armature. SC^2 and R^1 of hindwing stalked or not.
Early stages not known.
Hab. China, North India to Borneo and Java.
Six species.

Key to the species :

a. SC^2 and R^1 of hindwing on a long stalk .	.	*b.*
SC^2 and R^1 of hindwing not stalked .	258.	*S. chinensis.*
b. Hindwing with a blackish shadowy post-discal band; forewing (♂) with large creamy postdiscal patch ; postdiscal line of underside not prominent .	254.	*S. perversa.*
Hindwing without a blackish shadowy postdiscal band	.	*c.*
c. Mesothoracic tegula with a large yellow patch ; hindwing brown-black .	257.	*S. dohrni.*
Mesothoracic tegula without yellow patch	.	*e.*
d. Forewing above with a triangular brown-edged subapical costal patch . .	259.	*S. (?) decoratus.*
Forewing above without a triangular brown-edged subapical costal patch .	256.	*S. quadripunctatus*, and 255. *S. terranea.*

254. Smerinthulus perversa.

**Cypa olivacea* Rothschild, Nov. Zool. i. p. 70. t. 7. f. 6 (1894) (partim : ♀, Sikhim ; *non* ♂, Borneo).
Cypa perversa id., *l.c.* ii. p. 28 (1895) (♂, Khasia Hills) ; id., *l.c.* iii. t. 13. f. 5 (♂) (1896).

♂♀. The Sikhim specimen, which was described as the ♀ of *olivacea*, is doubtless the ♀ of *perversa* ; it is very faded, but shows the black shadowy post-discal band on the hindwing which is present in the ♂, and the lobe R^3 of the forewing projects as strongly as in the ♂. Abdomen with black stigma-dots.

♂. Tenth tergite (Pl. XXIV. f. 18) broad, constricted at base and in middle, above longitudinally impressed mesially, sides convex, apex divided into two short pointed lobes : sternite (Pl. XXIV. f. 19) small, obtusely triangular, sides obliquely and shallowly sinuate. Clasper (Pl. XXXIII. f. 5) apically sinuate, the ventral lobe produced into a long, pointed, strongly chitinised process which curves upwards; ventral margin of clasper incrassate, basally armed with two sharp, long teeth, beneath which there is another small tooth ; the postmedian part of inner sheath of clasper convex, raised into a broad fold ventrally, which ends in a boot-shaped obtuse process (*pr*). Penis-sheath without armature.

♀. Vaginal plate (Pl. XVII. f. 8) large, distal margin sinuate, with the angles rounded ; orifice proximal, a low ridge in front of it. Eighth tergite halfmoon-shaped, the apical margin being strongly rounded.

Early stages not known.

Hab. North India.

In the Tring Museum 2 ♂♂, 1 ♀ from : Khasia Hills ; Sikhim ; one of the Khasia Hills specimens caught in March.

255. Smerinthulus terranea.

Mimas terranea Butler, *Proc. Zool. Soc. Lond.* p. 310. n. 5. t. 22. f. 3 (♀) (1876) (Ayerpanas, Mal. Pen.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 640 (1877).
Dilina terranea, Kirby, *Cat. Lep. Het.* i. p. 709. n. 3 (1892).

♂♀. Butler's figure of the ♀ is very bad ; it does not at all agree with the description. The type seems to be lost, or may be contained in some obscure collection which we have not seen. A ♂ in the Tring Museum is doubtless this species ; it agrees in the shape of the forewing nearly with *quadripunctatus*, but the outer margin is less sinuate between SC^5 and R^3 ; upperside of hindwing, middle of basal two-thirds of underside of forewing, and a streak along abdominal fold of underside of hindwing, ferruginous. Anterior tarsus blackish. Our Borneo ♀ has (like the Penang ♂) the forewing straight from SC^5 to angle, there being very small teeth at R^3 and M^1. The hindwing is much more brownish than in the ♂, the forewing below is only feebly shaded with ferruginous, and there is no ferruginous streak before the abdominal margin of the hindwing. The black stigmata are distinct. The outer discal line of the forewing above is also distinct, convex beyond R^3, submarginal area with a series of paler patches. Outer discal line of underside very prominent, straight, the wing pale proximally of the line.

♂. Tenth abdominal tergite very remarkable (Pl. XXIV. f. 15), mesially membranaceous and clothed with dispersed bristles, sides produced into a long, curved and pointed process ; sternite (Pl. XXIV. f. 14) short, apical margin evenly concave, the sides slightly projecting. Clasper (Pl. XXXIII. f. 6) triangular, apex slightly curved ventrad, apical edge armed with small sharp teeth : a small

basi-dorsal fold which stands in connection with a very long and very slender basal process. Penis-funnel (Pl. XXXIII. f. 6, P-F) with the apex somewhat tuberculiform above ; penis-sheath without armature.

♀. Not seen.

Early stages not known.

Hab. Malay Peninsula ; Penang ; Borneo.

In the Tring Museum 1 ♂ from Penang (C. Curtis) ; a ♀ from Penungah, N. Borneo, 20 xii. '93 (D. Cator).

256. **Smerinthulus quadripunctatus.**

Smerinthulus quadripunctatus Huwe, *Berl. Ent. Zeitschr.* xl. p. 371. n. 47. t. 3. f. 3 (♂) (1895) (Java ; – coll. Huwe).

♂. We have not seen this species. The antennae of the type, judging from figure, are doubtless those of another Sphingid glued on ; they are much too long. The hindtibia is stated to have *one* weak, short spur, which is of course a mistake. The species is apparently related to *dohrni*, from which it differs *inter alia* in the conspicuous black stigmata of fore- and hindwing and the bright brick-red upperside of the hindwing, and comes very close to *terranea*, if it is not the same.

Hab. Java.

257. **Smerinthulus dohrni** spec. nov. (Pl. II. f. 5, ♂).

♂. Body above dark ferruginous, pronotum darker, a large anterior patch on mesothoracic tegula pale, golden behind, some golden scales on metanotum, apex of second and seventh abdominal tergites and a lateral spot each at apex of fifth and sixth tergites also golden ; a series of conspicuous pale golden mesial apical spots on segments 3 to 6. Underside somewhat paler than upper, abdomen with pale golden side-dots.

Wings, *upperside*.——Forewing like body ; costal edge pale for the greater part ; lines all transverse ; see figure.——Hindwing brown-black, the ferruginous colour appearing at abdominal margin and anal angle, costal area buff-pink.

Underside clayish tawny ochraceous, speckled with brown ; a brown line beginning at costa of forewing midway between subcostal fork and apex and running straight to anal angle of hindwing, being very little curved on forewing and not at all on hindwing ; it crosses M^1 of hindwing halfway from cell to distal margin ; a trace of a brown line on forewing just outside cell; a distinct S-shaped line on hindwing crossing M at base of M^2.

Not dissected.

Length of forewing : ♂, 22 mm.

Hab. Sumatra.

One ♂ from Soekaranda (Dohrn) in the Stettin Museum.

258. **Smerinthulus chinensis** spec. nov.

♂. In appearance similar to *Cypa decolor*. Antenna rather longer than in *perversa* and *C. decolor*, not quite half the length of the forewing, the segments more dilated dorso-laterally than in the allied insects, subpectinate, end-segment not longer than basally high. Abdomen without spinules. Apex of hindwing strongly rounded ; SC^2 and R^1 *not* stalked ; D^2 curved, oblique ; D^3 shorter than D^1 ; lower angle of cell acute. General colour as in *C. decolor*, hindwing brighter.——

Forewing broader than in *C. decolor*, distal margin sinuate between SC^5 and R^3, minutely toothed at R^3 and M^1, hinder angle less projecting than in *C. decolor* : four transverse lines above, darker tawny-brown, two antemedian, two discal, besides a vestige of a sublasal line, the second line quite indistinct, fourth convex between R^3 and M^2, approaching the third at inner margin.——Hindwing, above, dull ferruginous, distal margin shaded with fawn-colour, abdominal margin clayish.

Underside, both wings paler reddish than upperside of hindwing.——Forewing : the reddish colour extending to near distal margin behind and to subcostal fork in front, the area dentate, distal marginal area dark fawn-colour, two faint discal lines, corresponding to the discal lines of upperside, both nearly straight.——Hindwing with rather sharply marked discal lines, curving costad in front, the first across tip of cell ; no stigma.

Tenth tergite similar to that of *C. decolor*, more gradually narrowed ; sternite with a sharply pointed narrow mesial process. Clasper narrowly sole-shaped, inner surface not deeply concave, a setiferous fold beginning dorsally at base and extending obliquely ventrad, followed by a subdorsal patch of wrinkles ; harpe very strongly chitinised proximally, here dilated, a single distal process, which appears simply pointed in a side-view, but is excavate above and obliquely truncate at end. Penis-sheath curved, the opening partly covered by a kind of operculum.

♀ and early stages not known.

Hab. China : Léou-Pang (Mouton).

One ♂ in coll. Charles Oberthür.

Represents perhaps a separate genus.

259. Smerinthulus (?) decoratus (Pl. LXV. f. 2, ♀).

Smerinthus decoratus Moore, *Proc. Zool. Soc. Lond.* p. 568 (1872) (Sikhim : coll. Lang : where type?).
Triptogon decorata, Butler, *Trans. Zool. Soc. Lond.* ix. p. 588. n. 14 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 27. n. 146 (1887).
Marumba decoratus, Kirby, *Cat. Lep. Het.* i. p. 707. n. 13 (1892).
Cypa decorata, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 71. n. 93 (1892) (Sikhim) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 407. n. 93 (1898) ("not seen").

♀. All we know of this insect, besides the descriptions given by Moore and Hampson, is a pencil sketch in Dr. Moore's possession. We give a figure taken from this sketch in order to enable the reader to identify the species. As no structural characters are given in the descriptions we do not know with certainty where to put *decoratus*. It looks somewhat like *Phyllosphingia dissimilis*, excepting the hindwing, and reminds one also of *Mimas tiliae*.

Hab. Sikhim.

LXXVII. DEGMAPTERA.—Typus : *mirabilis*.

Cypa, Rothschild (*non* Walker, 1864), Nov. Zool. i. p. 512 (1894).
Degmaptera Hampson, in Blanf., *Fauna Brit. Ind., Moths* iv. p. 452 (1896).

♂♀. Differs from *Smerinthulus* in the hindwing being produced frontad near apex into a rounded lobe, the costal margin more or less sinuate proximally of this lobe, vein C almost following the curve of the lobe, not straight as in *Cypa* and *Smerinthulus*, stalk SC^2—R^1 shorter than D^2. Pilifer vestigial, naked.

Early stages not known.

Hab. North India ; Borneo.

Two species, which differ essentially in the outline of the costal margin of the hindwing, the margin being deeply sinuate beyond middle in *D. mirabilis*, while it is straight to beyond middle and then convex, without the deep sinus, in *D. olivacea*.

260. Degmaptera mirabilis.

**Cypa mirabilis* Rothschild, *l.c.* (♀, Khasia Hills;—Mus. Tring); id., *l.c.* i. p. 664 (1894); id., *l.c.* iii. t. 13. f. 4 (♀) (1896).

Degmaptera mirabilis, Hampson, *l.c.* fig. 240 (♂) (Khasia Hills; Sikhim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 407. n. 92a (1898) ("not seen").

♂♀. The distal margin of both fore- and hindwing of the ♂ is much more strongly sinuate before hinder angle than in the ♀. There is a peculiar fawn-coloured band on the forewing in both sexes just beyond the cell, stopping at M^2 or SM^2. The conspicuous black stigma has a minute transparent centre. Abdomen with a dorsal central row of pale golden dots.

♂. Tenth tergite (Pl. XXIV. f. 16) very broad, broadly sinuate, the two lobes produced into sharp hooks which curve ventrad; no sternite, but at each side of the anal cone a hairy lump reminding one of a similar structure found in many other *Ambulicinae* (see *Marumba*). Clasper (Pl. XXXIII. f. 3) widest before end, dorsal margin incrassate, bent inwards; from beneath it projects a long sharp spine; apex of clasper produced into a hook, which bears a tooth; two small teeth at the dorsal apical edge of the clasper; harpe a ventral elongate piece of chitin, curved upwards at end, resembling the runner of a sledge. Penis-sheath without armature.

♀. Vaginal plate (Pl. XVII. f. 7) with the orifice (*V*) proximal, situated upon a triangular smoothly chitinised plate, the proximal and lateral edges of which are turned upwards; postvaginal part of plate (*pvp*) short, broadly rounded, weak, transversely wrinkled.

Hab. North India.

In the Tring Museum 1 ♂, 2 ♀♀ from: Khasia Hills, Assam, March; Sikhim, June (Pilcher). Also in the collection of Mons. Charles Oberthür; not seen in other collections.

261. Degmaptera olivacea.

Cypa olivacea Rothschild, Nov. Zool. i. p. 70. t. 7. f. 6a (♂) (1894) (♂, non ♀; N. Borneo;—Mus. Tring); Hampson, *l.c.* iv. p. 453 (1896).

♂. What has been described as the ♀ of this species does not belong here, but is that sex of *Smerinthulus perversa*. Tenth tergite (Pl. XXIV. f. 17) very peculiar, convex above, with a mesial groove, the sides turned downwards and produced into two truncate processes separated from one another by a rounded sinus; apex deeply incised, the lobes narrow, pointed, curved downwards: no sternite. Clasper (Pl. XXXIII. f. 4) broad, irregularly rounded; dorsal margin incrassate and turned inwards, ending in two teeth; two folds run from this point proximad, one ventral, the other subdorsal, a third fold parallel with the latter, more proximal; harpe represented by a sunken plate of chitin (*H*) which is rounded-angulate distally above and below; its upper margin is proximally produced into two slender, curved, pointed processes which are directed *basad* towards the penis-funnel (P-F), which is dorsally open. No armature on penis-sheath.

♀. Not known.

Hab. North Borneo.

One ♂ in the Tring Museum from Labuk, British North Borneo, May 20. 1895 (Cator). Not seen in other collections.

LXXVIII. MIMAS.—Typus : *tiliae*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Spectrum Scopoli, *Intr. Hist. Nat.* p. 413 (1777) (partim ; incl. type of *Sphinx*).
Smerinthus Latreille, *Hist. Nat. Crust. Ins.* iii. p. 401 (1802) (partim ; incl. type of *Sphinx*).
Dilina Dalman, *Kongl. Sv. Vet. Ak. Handl.* p. 212 (1816) (partim ; incl. type of *Sphinx*).
Mimas Hübner, *Verz. bek. Schm.* p. 142 (1822) (type : *tiliae*).
Lucena Rambur, *Faune Andal.* p. 329 (1842) (type : *tiliae*).

Differs from *Polyptychus* in the palpus being very roughly scaled and hairy.

♂ ♀. Tongue short ; pilifer with bristles. Palpus small, rough with long scales and hairs, much smaller in ♀ than in ♂ ; joint not open. Antenna : ♂, compressed, laterally impressed, fasciculated ciliae of both the proximal and apical series long, dorsal edge of groove projecting, outline of antenna undulate in dorsal view ; ♀, proximal segments slightly depressed, transsection transversely oval, middle segments slightly compressed, not grooved, feebly constricted at the joints, seriated ciliae not distinctly prolonged, subdorsal ones somewhat longer than the others. Abdomen with large underscales, spines only at the apical edges of the tergites, these spines weak, not numerous, partly modified to sinuate scales. R^3 of hindwing before centre of cell, cross-veins not or feebly curved, lower angle of cell not very acute. Tibiae *spinose* ; spur of foretibia nearly reaching end ; hindtibia with *two* pairs of spurs. Pulvillus, paronychium, frenulum, and retinaculum *present*. Clasper and eighth tergite without organ of friction.

Larva strongly tapering to head, annules prominent, granules not prominent excepting those at side-bands ; head strongly triangular, much smaller than in *Sphinx ocellata* and *Amorpha populi*, narrower, almost smooth ; horn long, granulose ; anal tergite dark in middle, with two larger and some smaller tubercles. —Food-plants : *Tilia*, *Alnus*, etc.

Chrysalis opaque, densely granulose-rugose all over ; two frontal tubercles ; clypeus and pilifer not prominent ; tongue-case reaching to wing-cases, being *longer* than the leg-cases ; wing-case sinuate ; abdominal sternites with large umbilicate punctures ; cremaster rough with acute tubercles.

Hab. Palaearctic Region : West Europe to Japan.

One species.

262. **Mimas tiliae.**

Sphinx tiliae Linné, *l.c.* n. 3 (1758).

♂. Tenth abdominal tergite (Pl. XXIV. f. 22) somewhat spoon-shaped, faintly sinuate (the sinus barely indicated in an example from Firenze, Italy) ; lobe of sternite variable individually curved upwards. Clasper rounded or subtriangular. Harpe distally with two teeth sinuate between them (Pl. XXXIII. f. 10), occasionally rough at the edges with small notches. Penis-sheath with a movable apical process (Pl. XXIX. f. 46), which is armed at the end with two small sharp teeth, these variable individually in size and position.

♀. Eighth tergite rounded, feebly chitinised. Vaginal plate rather large (Pl. XVII. f. 5) ; proximal edge of orifice raised, shallowly sinuate.

Larva and chrysalis see above ; the former somewhat variable in colour, occasionally with red blotches.

Hab. Palaearctic Region.

Two subspecies :

a. M. tiliae tiliae.

Merian, *Eur. Ins.* ii. t. 74 (1683) ; Raj., *Hist. Ins.* p. 150. n. 1 (1710) ; Albin, *Nat. Hist. Engl. Ins.* t. 10 (1720) ; Frisch, *Ins.* vii. p. 3. t. 2. f. 1–4 (*l, p, i.*) (1728) ; Réaum., *Hist. Ins.* i. t. 2. f. 1 (1734) ; Rocs., *Insect. Belust.* i. 1. *Nachtv.* p. 9. t. 2. f. 5. 6 (1746) ; Wilke, *Engl. Moths* i. s. u. p. 10. t. 4 (1747) ; Hemmerich, *Coll. Cur. Ins.* t. 11. f. c (175–) ; Gronov., *Act. Helv.* v. p. 140. n. 310 (1762) ; Geoffr., *Hist. Ins.* ii. p. 80. n. 2 (1762) ; Gronov., *Zooph.* p. 201. n. 818 (1764) ; Seba, *Thes.* iv. t. 53. f. 4. 5. 6. & t. 59. f. 1. 2. 3. (1765) ; Harris, *Aurel.* t. 20. fig. d. f. g (1766) ; Schaeff., *Icon. Rat.* t. 100. f. 1. 2 & t. 203. f. 3 (1766) ; id., *Elem. Ent.* t. 116. f. 1 (1766) ; Deg., *Mem. Ins.* ii. 1. p. 246. t. 3. f. 7 (1771) ; Ernst & Engr., *Ins. Eur.* iii. p. 109. t. 116. fig. d. e. ; t. 117. fig. f.—k. ; t. 118. fig. p. s. (1782).

Sphinx tiliae Linné, *Syst. Nat.* ed. x. p. 489. n. 3 (1758) ; id., *Fauna Suec.* ed. ii. p. 287. n. 1085 (1761) ; Poda, *Mus. Graec.* p. 79. n. 1 (1761) ; Scop., *Ent. Carn.* p. 183. n. 467 (1763) ; Linné, *Mus. Lud. Ulr.* p. 343 (1764) ; Hufn., *Berl. Mag.* ii. p. 188. n. 20 & p. 195 note (1766) ; Houtt., *Natuurl. Hist.* i. 11. p. 405. n. 3 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 797. n. 3 (1767) ; Beckm., *Epit.* p. 160. n. 3 (1772) ; Müll., *Naturs.* v. 1. p. 636. n. 3 (1774) ; Gled., *Forstwissensch.* i. p. 309. n. 1 (1775) ; Fabr., *Syst. Ent.* p. 537. n. 4 (1775) ; Fuess., *Schweiz. Ins.* p. 32. n. 613 (1775) ; Harris, *Engl. Lep.* p. 30. n. 207 (1775) ; Schiff. & Den., *Wien. Verz.* p. 41 (1776) ; Kleem., in Mad., *Raupenkalд.* p. 51. n. 140, p. 70. n. 198 (1777) ; Fuessl., *Mag. Ent.* i. p. 264 (1778) ; Leske, *Anfangsgr. Naturg.* i p. 457. n. 2 (1779) ; Esp., *Eur. Schm.* ii. p. 38. t. 3. & *Suppl.* t. 22. f. 4 (1779) ; Goeze, *Ent. Beytr.* iii. 2. p. 142. n 3 (1780) ; Barb., *Gen. Ins. Linn.* p. 177 (1781) ; Fabr., *Spec. Ins.* ii. p. 141. n. 9 (1781) ; Lang, *Verz. Augsb.* p. 65. n. 539 (1782) ; Retz., *Gen. Ins.* p. 35. n. 34 (1783) ; Fourcr., *Ent. Paris.* ii. p. 251. n. 2 (1785) ; Fuessl., *N. Mag.* iii. p. 143 (1786) ; Borkh., *Schm. Eur.* ii. p. 110. n. 4 (1789) ; Gmel., *Syst. Nat.* i. 5. p. 2373. n. 3 (1790) ; Rossi, *Fauna Etr.* ii. p. 160. n. 1048 (1790) ; View., *Verz. Brand.* p. 4. n. 3 (1790) ; Brahm, *Insectenkalд.* ii. 1. p. 420. n. 296 (1791) ; Schwarz, *Raupenkalд.* p. 194. 350. 495. 635 (1791) ; Borkh., *Rhein. Mag.* i. p. 324. n. 148 (1793) ; Fabr., *Ent. Syst.* iii. 1. p. 358. n. 10 (1793) ; Donov., *Brit. Ins.* x. p. 3. t. 325 (1801) ; Walck., *Faune Paris. Ins.* ii. p. 277 (1802) ; Panz., *Nomencl. Schaeff.* p. 110. n. 177 (1804) ; Schrank, *Fauna Boica* ii. 1. p. 222. n. 1382 (1804) ; Thunb., *Mus. Nat. Ups.* xxxiii. p. 10 (1804) ; Hübn., *Samml. Eur. Schm.* ii. t. 15. f. 72 (1805-) ; id., *Gesch. Schm.* ii. *Sph.* iii. *Leg.* p. b. f. 2a (1806-18) ; Turt., *Syst. Nat.* iii. 2. p 169 (1806) ; Ochs., *Schm. Eur.* ii. p. 246. n. 1 (1808) ; Nagel, *Hülfsb. Schm.* p. 144 (1818) ; God., *Lép. France* iii. p. 64. n. 16. t. 20. f. 1 (1821).

Spectrum tiliae, Scopoli, *l.c.* (1777).

Smerinthus tiliae, Latreille, *Hist. Nat. Ins. Crust.* iii. p. 401 (1802) ; id., *Gen. Ins. Crust.* iv. p. 209 (1809) ; id., in *Nouv. Dict. Hist. Nat.* xxxi. p. 352. t. 24. f. 5 (1819) ; Sam., *Ent. Comp.* p. 243 (1819) ; Lep. & Serv., *Enc. Méth.* x. p. 441. t. 63. f. 2. 3. 4 (1825) ; Steph., *Illustr. Brit. Ent., Haust.* i. p. 113 (1828) ; id., *Cat. Brit. Ins.* ii. p. 30 (1829) ; God., *Lép. France Suppl.* ii. p. 162 (1832) ; Luc., *Lép. Eur.* p. 117. t. 49 (1834) ; Beske, in Silberm., *Rev. d'Ent.* ii. p. 177 (1834) (Hamburg) ; Friv., *ibid.* p. 181 (1834) (Hungary) ; Thon, *Naturg. Schm.* p. 109. t. 54. f. 747. 748. 749 (1837) ; Blanch., *Hist. Nat. Ins.* iii. p. 481 (1840) ; Westw., *Brit. Moths* p. 7. t. 1. f. 7. 8. 9 (*i., p., l.*) (1843) ; Pierr., *Bull. Soc. Ent. France* p. 70 (1844) ; Eversm., *Fauna Volgo-Ural.* p. 114 (1844) (v. vi.) ; Asm., *Zeitschr. Ent. Breslau* i. p. 5 (1847) ; Herr.-Sch., *Eur. Schm.* ii. p. 91. n. 29 (1847) ; Walk., *List Lep. Ins. B. M.* viii. p. 241. n. 2 (1856) ; Stand. & Wocke, *Cat. Lep.* p. 16. n. 23 (1861) ; id., *l.c.* ed. ii. p. 37. n. 480 (1871) ; Wall., *Skand. Het. Fjär.* p. 15. n. 2 (1863) ; Ball., *Bull. Moscou* p. 364 (1864) (Gorki) ; Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Gav., *ibid.* x. p. 197. n. 76 (1867) (Groningen) ; Snell., *Vlind. Ned.* p. 101. n. 2 (1867) ; Tengstr., *Act. Soc. F. F. Fenn.* x. p. 6. n. 96 (1869) ; Ebrard, *Bull. Soc. Ent. France* p. 70 (1870) (éclos.) ; Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 75 (1870) (Breda) ; Brutt., *Progr. Gymn. Dorpat* p. 24. n. 10 (1872) (v. vi.) ; Siebke, *Enum. Ins. Norv.* iii. p. 25. n. 1 (1874) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 44. n. 34 (1875) ; Newm., *Entom.* viii. p. 193. fig. (1875) ; Leeuw., *Tijdschr. Ent.* xix. *Versl.* p. 106 (1876) ; Gir., *Bull. Soc. Ent. France* p. 98 (1879) ; Thed., *Ent. Tidskr.* i. p. 197 (1880) (Sweden) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 45 (1880) ; Weil., *Progr. Oberrealsch. Innsbr.* p. 15 (1880) ; Albr., *Bull. Moscou* p. 379 (1882) (Moscow) ; Rom., *Mém. Lép.* i. p. 71 (1884) (Borjom ; Manglis ; Lagodekhi ; vii.) ; Kroul., *Bull. Soc Oural* xi. p. 213. n. 89 (1885) (Sarapoul, E. iv.—M. vi.) ; id., *l.c.* p. 239. n. 59 (1885) (Ourjoum) ; Poult., *Trans. Ent. Soc. Lond.* p. 297 (1885) (postembr. devel.) ; id., *l.c.* p. 137 (1886) ; Lampa, *Ent. Tidskr.* vi. p. 27. n. 119 (1885) ; Haar., *Tijdschr. Ent.* xxix. p. 30 (1886) (Alblasserwaard) ; Amel., *Berl. Ent. Zeitschr.* xxxi. p. 261 (1887) (Dessau) ; Mina-Pal. & Failla-Ted., *Nat. Sci.* vii. p. 42 (1889) ; Clark, *Entom. Rec.* i. p. 327. t. A (1891) (variability) ;

Car., *Iris* vi. p. 188 (1893) (Hte. Garonne) ; Hofm., *Grossschm.* p. 30. n. 1. t. 18. f. 3 (1893) ; id., *Grossschm.* p. 30. t. 8. f. 4 (1894) ; Rothsch., *Entom.* xxvii. p. 50 fig. (1894) (asym. specim.) ; Barrett, *Lep. Brit. Is.* ii. p. 11. t. 43. f. 1. a-e (1895) ; Vos, *Tijdschr. Ent.* xli. p. 80 (1898) (Apeldoorn) ; Bartel, in Rühl, *Grossschm.* ii. p. 146 (1900).

Laothoë tiliae, Fabricius, in Illig., *Mag. Ent.* vi. p. 287 (1807).

Dilina tiliae, Dalman, *Kongl. Sv. Vet. Ak. Handl.* p. 212 (1816) ; Kirby, *Cat. Lep. Het.* i. p. 709. n. 1 (1892) (Europe ; Siberia) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 100. n. 730 (1901).

Sphynx (!) *tiliae*, Vogel, *Schm.-Cabin.* i. p. 25. t. 5. f. 1. a. b (1821).

Mimas tiliae, Hübner, *Verz. bek. Schm.* p. 142. n. 1522 (1822) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 583. n. 2 (1877) ; Tutt, *Brit. Lep.* iii. p. 399 (1902).

Sphinx (!) *tiliae* (!), Gray, in Griff., *Anim. Kingd.* xv. p. 598 (1832).

Smerynthus (!) *tiliae*, Cantener, in Silberm., *Rev. d'Ent.* i. p. 77 (1833) (Dép. du Var, v. vi.).

Lucina tiliae, Rambur, *Faune Andal.* p. 330 (1842) (Malaga).

Papilio ulmi Lucas, *Lép. Eur.* ed. ii. p. 147 (1864) (sub syn.).

Smerinthus tiliae (!), Fallou, *Bull. Soc. Ent. France* p. 58 (1870) (monstr.).

Smerinthus tiliae var. *ulmi* "Schunk," Heydenreich, *Lep. Eur. Cat.* p. 19. n. 30a (1851) (*nom. nud.*); Caradja, *Iris* vi. p. 188 (1893) ; Bartel, in Rühl, *Grossschm.* ii. p. 149 (1900).

Smerinthus tiliae var. *maculata* "Mützel," Heydenreich, *l.c.* p. 19. n. 30b (1851) (*nom. nud.*) ; Wallengren, *Skand. Het. Fjär.* p. 15 (1863) ; Lampa, *Tidskr.* vi. p. 27. n. 119 (1885) ; Renter, *Act. Soc. F. F. Fenn.* ix. 6. p. 20. n. 96 (1893).

Smerinthus tiliae ab. *pechmanni* Hartmann, *Mitth. Münch. Ent. Ver.* iii. p. 35. t. 3. f. 1. 2. 3 (1879) (München) ; Bartel, in Rühl, *Grossschm.* ii. p. 150 (1900).

Mimas tiliae ab. *ulmi*, Maassen, *Stett. Ent. Zeit.* xli. p. 60 (1880) (*nom. nud.*).

Smerinthus tiliae ab. *obsoleta* Clark, *Entom. Rec.* i. p. 328. t. A. f. 1 (1891).

Smerinthus tiliae ab. *bipunctata* id., *l.c.* f. 3.

Smerinthus tiliae ab. *centripuncta* id., *l.c.* f. 7.

Smerinthus tiliae ab. *costipuncta* id., *l.c.* f. 8.

Smerinthus tiliae ab. *suffusa* id., *l.c.* f. 10.

Smerinthus tiliae ab. *brunnea* Caradja, *Iris* vi. p. 188. (1893) (*nom. indescr.*) ; Bartel, in Rühl, *Grossschm.* ii. p. 149 (1900).

Smerinthus tiliae ab. *immaculata* id., *l.c.*

Dilina tiliae ab. *brunnescens* Standinger, in Staud. & Reb., *Cat. Lep.* ed. iii. p. 100. sub n. 1 (1901).

Dilina tiliae ab. *exstincta* id , *l.c.*

Mimas tiliae ab. *pallida-transversa* Tutt, *Brit. Lep.* iii p. 403 (1902).

Mimas tiliae ab. *pallida-bipunctata* id., *l.c.*

Mimas tiliae ab. *pallida-costipuncta* id., *l.c.*

Mimas tiliae ab. *pallida-marginepuncta* id., *l.c.*

Mimas tiliae ab. *pallida-centripuncta* id., *l.c.* p. 404 (1902).

Mimas tiliae ab. *pallida-obsoleta* id., *l.c.*

Mimas tiliae ab. *marginepuncta* id., *l.c.*

Mimas tiliae ab. *brunnea-transversa* id., *l.c.*

Mimas tiliae ab. *brunnea-costipuncta* id., *l.c.*

Mimas tiliae ab. *brunnea-marginepuncta* id., *l.c.*

Mimas tiliae ab. *brunnea-centripuncta* id., *l.c.*

Mimas tiliae ab. *brunnea-obsoleta* id., *l.c.*

Mimas tiliae ab. *virescens-transversa* id., *l.c.*

Mimas tiliae ab. *virescens-marginepuncta* id., *l.c.*

Mimas tiliae ab. *virescens-centripuncta* id., *l.c.*

Mimas tiliae ab. *virescens-obsoleta* id., *l c.*

♂ ♀. Very variable in the ground-colour and pattern ; the right and left wing often conspicuously different. The green colour disappears sometimes entirely (only in bred specimens ? such individuals can be produced by breeding in and in). The extremes in pattern are represented by (bred) individuals in which the green discal band is so dilated as to occupy nearly the whole wing (ab. *pechmanni*) and a form without a discal band (ab. *suffusa* = ab. *immaculata* = ab. *exstincta*). Mr. Tutt's double-barrelled names are very curious ; if the same system of nomenclature were employed in respect to colour, pattern and structure, we should arrive at combinations of half a dozen or more names according to the number of organs taken

into account. In Mr. Tutt's tabulation no cognisance is taken of the variability of the hindwing, which is as important as that of the forewing, considering that *tiliae* and *christophi* differ especially in the hindwing. An ab. *pallida-transversa* with dark hindwings is not the same as one with pale hindwings; so we should have ab. *pallida-transversa*-something; and this, combined with the variation in the venation, for instance, would give a four-barrelled name, and so on. The reader will doubtless perceive that we have here to do with a confusion of ideas, a name being replaced by a kind of diagnosis, while, in fact, the diagnosis should be replaced by a name.—Tenth segment see Pl. XXIV. f. 22 and Pl. XXVI. f. 37.

Larva (see above) variable in colour, easily distinguishable from those of *Sphinx ocellata* and *Amorpha populi* by the shape and structure.—Food-plants: *Tilia*, *Ulmus*; also *Betula*, *Quercus*, *Prunus*, etc.

Chrysalis see above.

For hybrid *tiliae* × *ocellata* see *Sphinx ocellata ocellata*.

Hab. Europe as far south as Andalusia and Sicily, eastwards to Transcaucasia and Western Siberia, northward to Northern Russia, Finland, Southern Scandinavia; not in Scotland and Ireland.

In the Tring Museum 130 odd specimens, and 7 *tiliae* × *ocellata*.

b. S. tiliae christophi.

**Smerinthus christophi* Staudinger, in Rom., *Mém. Lép.* iii. p. 162. t. 9. f. 3. a. b., t. 11. f. 1 (1887) (Wladiwostock; Ussuri;—coll. Staudinger); Leech, *Proc. Zool. Soc. Lond.* p. 586. n. 24 (1888) (Fujisan); Graes., *Berl. Ent. Zeitschr.* xxxii. p. 105. n. 185 (1888) (Amurland, *l.* on *Alnus*); Staud., *l.c.* vi. p. 238. n. 228 (1892) (Amurland); Bartel, in Rühl, *Grossschm.* ii. p. 150 (1900).
Dilina christophi, Kirby, *Cat. Lep. Het.* i. p. 709. n. 2 (1892) (Wladiwostock); Leech, *Trans. Ent. Soc. Lond.* p. 278. n. 38 (1898) (Fujisan; Yesso); Staud. & Reb., *Cat. Lep.* ed. iii. p. 100. n. 731 (1901) (Uss. m.; Jap.).
Smerinthus christophi ab. *alni* Bartel, *l.c.*
Mimas christophi, Tutt, *Brit. Lep.* iii. p. 399 (1902).

♂♀. This is nothing else but a representative form of *tiliae*, differing in the darker colour, which is never green, and in the more distal position of the dark submarginal shade of the hindwing; the spurs are, moreover, somewhat shorter and the tenth abdominal tergite and sternite are rather slenderer.

Larva similar to that of *tiliae tiliae*; not sufficiently known.—Food-plant: *Alnus*.

Hab. Amurland; Japan.

In the Tring Museum 5 ♂♂, 6 ♀♀; one larva, see Appendix.

LXXIX. CALLAMBULYX gen. nov.—Typus: *rubricosa*.

Ambulyx Walker, *List Lep. Ins. B. M.* viii. p. 122 (1856) (partim; type: *strigilis*).
Basiana, Moore (*non* Walker, 1856), *Proc. Zool. Soc. Lond.* p. 793 (1865).
Metagastes, Snellen (*non* Boisduval, 1875), *Tijdschr. Ent.* xviii. *Versl.* p. 22 (1880).
Clanis, Kirby (*non* Walker, 1856), *Cat. Lep. Het.* i. p. 702 (1892).

♂♀. Tongue short, weak, fringe at the mesial edges long. Pilifer somewhat swollen, with bristles. Genal process subglobose. Palpus slender, applied to the head, not projecting, larger in ♂ than in ♀. Labrum mesially raised to a high transverse tubercle. Scaling of head raised to a mesial crest. Antenna strongly compressed ventrally in ♂, sub-andromorphic in ♀; end-segment short, about as long as broad, with one or more bristles at tip, dorso-apical scales projecting beyond

tip of segment, but the tuft thus formed shorter than the last two segments together. Tibiae *simple*, longer than the respective first tarsal segments ; these little longer than the cell of the hindwing is broad ; spur of foretibia about half the length of the tibia ; those of mid- and hindtibia very *short*, long terminal one of hindtibia about half as long again as the tibia is broad ; paronychium with two lobes on each side ; pulvillus *present*. Frenulum and retinaculum *present*. Underscales of abdominal tergites partly spiniform.

♂. Eighth sternite simple ; clasper reduced, without friction-patch ; harpe strongly developed, the apical process double or simple, in the latter case (*junonia*) preceded by several teeth (Pl. XXXIV. f. 23).

♀. Vaginal plate differently armed in the two species of which this sex is known.

Early stages known only of *C. tatarinovi* ; of the same type as in *Sphinx ocellata*.

Hab. North India to Amurland and Japan, and the larger Sunda Islands.

The four species resemble one another in pattern, all having an oblique line or band on the forewing crossing the apex of the cell and then running along M^2 towards hinder angle, and an oblique apical line, the hindwing being red, the posterior half of the mesothoracic tegula being pale like the side of the metanotum, and the abdomen having a dark mesial line.

Key to the species :

a. Hindwing with a large black postdiscal patch centred with white	264.	*C. junonia*.
The black patch, if present, near margin, with a white dot behind it, not within		*b*.
b. Forewing produced at apex into a hook		*c*.
Forewing not strongly produced at apex .	266.	*C. tatarinovi*.
c. Basal area of forewing below washed with red	265.	*C. poecilus*.
Basal area of forewing below not washed with red	263.	*C. rubricosa*.

263. **Callambulyx rubricosa.**

**Ambulyx rubricosa* Walker, *List Lep. Ins. B. M.* viii. p. 122. n. 4 (1856) (Hindostan ;—Mus. Oxford) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 190. n. 13 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 582. n. (1877) (= *superba* ; Darjiling, Calcutta).

* *Basiana superba* Moore, *Proc. Zool. Soc. Lond.* p. 793 (1865) (Mus. Brit.).

♂ ♀. One of the finest Sphingids. The green colour of the forewing often fading into clayish. D^3 of the hindwing in most specimens longer than R^1. The lobes of the paronychium long.

♂. Tenth tergite (Pl. XXII. f. 10) weak, pale, gradually narrowed distad, apex more strongly narrowed and mesially feebly sinuate, the surface more or less concave, rough with bristle-bearing tubercles distally, the mesial line raised to a kind of carina ; the proximal part of this supra-anal plate (namely the ninth tergite) more strongly chitinised and densely clothed with long hair-scales which project beyond the end of the tenth tergite ; the tenth sternite reduced, without a lobe. Clasper narrow (Pl. XXXIV. f. 19), tapering to apex, which is rounded ; harpe strong, rounded ventro-distally, produced into a long and a short, curved, pointed process ; on a fold of the clasper, dorsally of the harpe, there is a dense clothing of spine-like bristles. Penis-sheath without armature.

♀. Vaginal plate see Pl. XV. f. 15.

Early stages not known.

Hab. North India; Malay Peninsula; Java; Borneo; occurring doubtless also in the interjacent countries.

Three subspecies:

a. C. rubricosa rubricosa.

**Ambulyx rubricosa* Walker, *l.c.*; Butl., *l.c.*; Cot. & Swinh., *Cat. Moths Ind.* i. p. 23. n. 127 (1887) (Sikhim); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 24. n. 93 (1892) (India); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 79. n. 106 (1892) (Sikhim; Calcutta?); Kirby, *Cat. Lep. Het.* i. p. 677. n. 45 (1892) (India); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 408. n. 106 (1898) (Sikhim, 3,000 ft., vii.).

**Basiana superba* Moore, *l.c.*

♂♀. The oblique olive-brown band across the forewing is nearly straight; the deep red postdiscal band of the hindwing extends to M^2; the lines of the underside of the forewing are at least partly red; the median line of the hindwing below is curved; the oblique apical line of the forewing above is white bordered with blackish brown.

Hab. North India: Sikhim; Assam.

In the Tring Museum 9 ♂♂, 5 ♀♀ from: Sikhim; Khasia Hills.

b. C. rubricosa piepersi.

**Metagastes piepersi* Snellen, *Tijdschr. Ent.* xxiii. *Versl.* p. 22 (1880) (Java, Kerdirie;—coll. Snellen). *Clunis piepersi*, Kirby, *Cat. Lep. Het.* i. p. 702. n. 2 (1892) (Java).

♂. The differences between this form and the preceding are not very conspicuous. The stigma of the forewing is barely vestigial, the deep red band of the hindwing becomes black between M^1 and M^2, the under surface is more yellow than in *rubr. rubricosa*, the lines are far less red.

Hab. Java.

In the collection of Mr. Snellen; also in the Stockholm Museum and the Standinger collection.

c. C. rubricosa amanda subsp. nov.

♂♀. The oblique band across the forewing, *above*, distinctly angulate at M^2, the costal portion having a less longitudinal direction than in the two preceding forms; the stigma is represented by a minute dot, the second discal line is very feebly dentate, while the first and third are not dentate; the oblique apical line is black, with just an indication of white scaling.——Hindwing: the black postdiscal patch of *piepersi* is here accentuated and enlarged, reaching from M^2 beyond M^1 halfway to R^3; the interspace between the second and third distinct anal lines widened between M^2 and SM^2 to a conspicuous white spot.

Underside yellow, the lines not bright red, but brown, the lines of the hindwing not curved, the first touching cell.

Hab. Borneo; Malay Peninsula.

In the Tring Museum 1 ♂ from Kina Balu, N. Borneo (*type*); 1 ♀ from Mt. Tahan, Malay Peninsula (Waterstradt).

The ♀ somewhat resembles *piepersi*; it represents possibly a separate subspecies.

264. Callambulyx junonia.

**Ambulyx junonia* Butler, *Illustr. Typ. Spec. Lep. Het. B. M.* v. p. 9. t. 80. f. 2 (1881) (Bhutan ;—Mus. Brit.) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 23. n. 125 (1887) (Bhutan) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 79. n. 107 (1892) (Bhutan ; Naga Hills) ; Kirby, *Cat. Lep. Het.* i. p. 677. n. 42 (1892) (Bhutan) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 408. n. 107 (1898) ("not seen").

♂. We have seen but two specimens of this apparently very rare species, which agrees in the structure of the antenna, legs, and palpus well with *C. rubricosa*.

Tenth abdominal tergite flat (Pl. XXII. f. 11), deeply sinuate, the lobes diverging, their mesial edge depressed, so that their upper surface slants inwards, each lobe with an inconspicuous median cariniform tubercle. Clasper (Pl. XXXIV. f. 23) reduced distally ; harpe with a pointed apical hook and several, more proximal, teeth.

♀. Not seen.

Hab. Bhutan ; Naga Hills.

One ♂ in the British Museum ; a specimen from the Naga Hills in Mr. Elwes's collection ; also in coll. Swinhoe.

265. Callambulyx poecilus (Pl. I. f. 13, ♂).

**Ambulyx poecilus* Rothschild, Nov. Zool. v. p. 604. n. 4. fig. 2 (1898) (Murree ;—Mus. Tring) ; Hamps., *Journ. Bombay N. H. Soc.* xiii. p. 39. n. 106a (1900).

♂. Intermediate between *tatarinovi* and *rubricosa* ; the forewing as strongly falcate as in the latter, but red below in basal half as in certain specimens of the former. Tongue very weak ; pilifer with very few bristles. The tenth tergite similar to that of *rubricosa*, narrower, apex more suddenly narrowed, curved downwards, pointed ; ninth tergite with long hair-scales as in *rubricosa* ; sternite reduced, without lobe. Clasper (Pl. XXXIV. f. 21) widened distally into a subquadrate flap, bearing dorsally on the inner surface a high triangular crest, which is continuous with the subdorsal fold of the more proximal part of the clasper; this fold is rough with setiferous tubercles ; harpe somewhat resembling that of *A. elwesi* in the shape of the distal part, but is less concave, and has, besides the long apical hook, a short subapical tooth at the dorsal edge ; the proximal ridge (*f*) high.

♀. Not known.

Hab. Murree, N.W. India.

One ♂ in the Tring Museum ; not seen in other collections.

266. Callambulyx tatarinovi.

Smerinthus tatarinovi Bremer & Grey, in Motsch., *Etud. Ent.* i. p. 62. n. 19 (1852) (N. China ;—Mus. St. Petropolis) ; id., *Schm. N. Chin.* p. 13. n. 57 (1853) ; Mén., *Enum. Corp. An. Mus. Petr., Lep.* p. 133. n. 1558. t. 13. f. 1 (♀) (1857) (= *eversmanni* ; Pekin ; Kiachta) ; Lucas, *Bull. Soc. Ent. France* p. 149 (1858) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 43. n. 33 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 593. n. 5. t. 90. f. 16 (*l.*) (1877) (Japan) ; Graes., *Berl. Ent. Zeitschr.* xxxii. p. 105. n. 186 (1888) (*l.* on *Ulmus*) ; Leech, *Proc. Zool. Soc. Lond.* p. 586. n. 25 (1888) (Yokohama ; Yesso) ; Staud., in Rom., *Mém. Lép.* vi. p. 237. n. 227 (1892) (Amurld. ; N. Chiua) ; Leech, *Trans. Ent. Soc. Lond.* p. 279. n. 40 (1899) (Yesso ; Yokohama) ; Bartel, in Bühl, *Grossschm.* ii. p. 164 (1900) (Kiachta ; Amurland, v. vi. ; Wladiwostock ; Pekin ; Japan) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 100. n. 729 (1901) (Amurld. ; N. China ; Japan ; Dauria).

Ambulyx tatarinovi, Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 24. n. 94 (1892) (Japan ; N. China).

Smerinthus (?) *tatarinovi*, Kirby, *Cat. Lep. Het.* p. 711. n. 7 (1892) (China ; Japan ; = *eversmanni*).

♂♀. The ordinary form has the upperside of the body and forewing more or less bright olive-green, but there occur also specimens with the green replaced by reddish brown. This form was discovered by Popoff at Kiachta, and described by Eversmann under the name of *eversmanni*, given to it *in litt.* by Popoff, who had apparently several specimens. There are two individuals of this form in the Paris Museum correctly identified as *eversmanni*. Standinger redescribed a Kiachta individual (bred in May 1855) as *brunnea*, not knowing that his individual was the true *eversmanni*, and doubtless one of the specimens distributed by Popoff. Bartel, *l.c.*, has correctly quoted *brunnea* as a synonym of *eversmanni*. By some oversight *eversmanni* is sunk as a synonym of *tatarinovi* in Staud. & Reb.'s Catalogue, *l.c.*, and *brunnea* kept as the name of the reddish brown form. Both Ménétriés and Boisduval, *l.l.c.c.*, mentioned the brown form; Butler, *l.c.*, overlooked the name of *eversmanni*. Leech records a brown specimen from Japan (now in the British Museum), and refers it doubtfully to "*brunnea*." We have another Japanese individual agreeing with *eversmanni* (= *brunnea*). The brown form, therefore, is not local. The synonymy is as follows :

a[1]. *C. tatarinovi* f. norm. *tatarinovi*.

Green form.

b[1]. *C. tatarinovi* f. ab. *eversmanni*.

Smerinthus eversmanni Eversmann, *Bull. Moscou* p. 182. t. 1. f. 5 (1854) (Kiachta ; descr. of larva ;— Mus. St. Petropolis).
Smerinthus tatarinovi, Ménétriés, *l.c.*
**Smerinthus tatarinovi* var. *brunnea* Staudinger, in Rom., *Mém. Lép.* vi. p. 238. sub n. 227 (1892) (Kiachta, v.;—coll. Staudinger); Leech, *Trans. Ent. Soc. Lond.* p. 279. sub n. 40 (1899) (Japan).
Smerinthus tatarinovi var. (ab.) *brunnea*, Staudinger & Reb., *l.c.* sub n. 729 (1901) (Kiachta; Japan).

There does not seem to be any difference between Japanese and Continental *tatarinovi*. The relationship of this species with *C. rubricosa* has not been recognised except by Swinhoe. Bartel, *l.c.*, p. 142, erroneously attributes only one pair of hindtibial spurs to *tatarinovi*.

Paronychium with the upper lobe very slender, the lower one broader, but short and heavily ciliate. The red colour on the underside of the forewing variable in extent.

♂. Tenth abdominal tergite slenderer than in the other species, gradually narrowed to the obtuse end and curved downwards ; upperside convex, punctured distally, clothed with short dispersed hairs ; tenth sternite reduced, without lobe ; ninth tergite with long hair-scales. Clasper (Pl. XXXIV. f. 20): apical half narrowed to form a rather slender lobe, which varies in breadth, but is always curved upwards, and on the inner surface rough with small tubercles ; a subdorsal fold (*pd*), connected distally with the dorsal edge of the clasper, projects above the harpe and is beset with numerous setiferous tubercles ; harpe of the same type as in *poecilus* and *rubricosa*, with two distal processes which stand close together, the upper one somewhat longer than the lower. Penis-sheath (Pl. XXIX. f. 45) dorsally prolonged into a narrow flap with which the membrane of the duct is connected ; in the contracted state of the duct the flap, which is dentate, is concealed in the interior of the sheath.

♀. Vaginal plate (Pl. XV. f. 16) characteristic : a long triangular lobe in

front of the vaginal orifice ending in two points; the lobe somewhat variable in shape individually.

Larva green, granulose; head triangular; seven white side-bands which are edged with crimson.—Food: *Ulmus*.

Pupa not described.

Hab. Amurland; Dauria; N. China; Japan.

In the Tring Museum 16 ♂♂, 9 ♀♀ from: Tokio, June; Yokohama, July; Kawagashi, July; Wladiwostock; Amurland; Ta-chiao-tze, China, July.

LXXX. ANAMBULYX gen. nov.—Typus: *elwesi*.

Ambulyx, Druce (*non* Walker, 1856), *Ent. Mo. Mag.* xix. p. 17 (1882).

♂♀. Differs from *Callambulyx*, of which it is a development, in the absence of the retinaculum, the reduction in length of the frenulum, the absence of the proximal pair of spurs from the hindtibia, and in the shape of the hindwing, which has the costal margin straight or feebly concave before and in middle, and externally convex as in *Phyllosphingia*.

Early stages not known.

Hab. North India.

One species.

267. Anambulyx elwesi.

**Ambulyx elwesi* Druce, *l.c.* (1882) (Darjiling;—coll. Druce); Waterh., *Aid Indent. Ins.* ii. t. 136. f. 3 (1883); Cot. & Swinh., *Cat. Moths Ind.* i. p. 23. n. 126 (1887) (Sikhim); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 79. n. 108 (1892) (Sikhim); Kirby, *Cat. Lep. Het.* i. p. 677. n. 43 (1892) (Darjiling); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 408. n. 108 (1898) ("not seen").

♂♀. The pale interantennal bar of *rubricosa* is wanting; the oblique apical line of the forewing is also not marked. A heavy-bodied insect with comparatively short wings, which is easily recognised by the very broad brown-black border of the rosy red hindwing and the olive-yellow stigma of the forewing.

♂. The tenth tergite smooth, rounded at the end, which is turned downwards, longitudinally grooved; the ninth tergite (proximal part of the supra-anal process) not hairy; tenth sternite mesially produced into a triangular, apically rounded lobe. Clasper obliquely rounded at apex (Pl. XXXIV. f. 22), this apical lobe smaller than the harpe, which is concave, spoon-shaped, with the apex produced into a pointed hook, which is directed dorsad; the dorsal edge of the clasper is widened internad near the end of the harpe and densely beset with stiff hairs; the dense tuft of hair-scales near the apex of the harpe is about twice as long as the clasper is broad before the end. Penis-sheath dorsally longer than ventrally, being obliquely truncate, without external armature; within the sheath there is a membranaceous flap densely covered with pointed tubercles.

♀. Vaginal plate (Pl. XV. f. 14) deeply concave at the sides; two obtuse flaps in front of the vaginal orifice, separated from one another by a deep sinus.

Hab. North India: Sikhim and Assam. Rare in collections.

In the Tring Museum 2 ♂♂, 2 ♀♀, from the Khasia Hills.

LXXXI. SPHINX.—Typus : *ocellata*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Spectrum Scopoli, *Intr. Hist. Nat.* iii. p. 413 (1777) (partim ; includes type of *Sphinx*).
Smerinthus Latreille, *Hist. Nat. Crust. Ins.* iii. p. 401 (1802) (partim ; includes type of *Sphinx*).
Laothoë Fabricius, in Illig., *Mag. Ent.* vi. p. 287 (1807) (partim ; includes type of *Sphinx*).
Dilina Dalman, *Kongl. Vet. Ak. Handl.* xxxvii. p. 212 (1816) (partim ; includes type of *Sphinx*).
Paonias Hübner, *Verz. bek. Schm.* p. 142 (1822) (partim ; includes type of *Sphinx*).
Merinthus (!) Meigen, *Handb. Schm.* p. 100 (1827) (partim ; correct. of *Smerinthus* !).
Eusmerinthus Grote, *Canad. Ent.* ix. p. 132 (1877) (type : *jamaicensis*).
Calusymbolus Grote (*non* id., 1877), *Hawk Moths N. Am.* p. 34 (1886).
Calusymbolus Copismerinthus Grote, *l.c.* p. 35 (1886) (type : *cerisyi*).
Copiosmerinthus (!), Kirby, *Cat. Lep. Het.* i. p. 712 (1892).
Cypa, Hampson (*non* Walker, 1856), *Journ. Bombay N. H. Soc.* xiii. p. 38 (1900).
Daddia Tutt, *Brit. Lep.* iii. p. 386 (1902) (*nom. nud.*).
Bellia id., *l.c.* (*nom. nud.*).
Nicholsonia Tutt, *l.c.* (*nom. nud.*).

♂ ♀. Tongue very weak and short. Palpus small in ♀, larger in ♂. Abdomen spinose all over dorsally, the spines very weak, dense at and near the apical edges of the segments ; no broad under-scales on the tergites. Retinaculum absent ; frenulum reduced, the bristle of ♂ short but rather stout, the bristles of ♀ thin, hair-like. Pulvillus and paronychium present. Tibiae not spinose ; anterior tibia with or without apical thorn ; one pair of spurs to hindtibia. Hindwing red for the greater part.

♂. Antenna more distinctly dilated laterad than in *Amorpha*, sometimes subpectinate, or even pectinate. Tenth abdominal tergite rounded at end, or feebly sinuate (*caecus*); sternite triangular, simple. Harpe simple, rounded or obtusely pointed at end, not divided as in *Amorpha*. Penis-sheath with one or two conical teeth at end, pointing laterad.

♀. Antenna (Pl. LX. f. 14—17) with traces of the lateral expansions of ♂. Vaginal plate membranaceous, without a distinct ridge in front of the vaginal cavity, or the ridge is more or less wrinkled, not strongly chitinised.

Larva granulose, head triangular ; horn tuberculated ; green, with white or yellowish side-bands, often spotted with red.—Food-plants : *Populus*, *Prunus*, *Salix*, and other trees.

Pupa stout, more or less rugulose and punctured, somewhat glossy, sheath of antennae rather broad in both sexes.

Hab. Palaearctic and Nearctic Regions.

Six species.

According to what we have said in the introduction, the type of *Sphinx* is *ocellata*. Synonymous with *Sphinx* are the generic names *Laothoë*, *Dilina*, and *Paonias*, which have all *ocellata* for types. The Grotean genus *Eusmerinthus*, reduced to the rank of a subgenus by its author in 1886, is based upon one Nearctic species (*jamaicensis*) which differs in the ♂-antenna from all the allied forms, and on some Palaearctic species which are not very nearly related to *jamaicensis*. There is some reason to separate *jamaicensis* from the other species, and we should not reject *Eusmerinthus* as a genus if there was a character, apart from colour, by which the ♀ could be distinguished. This *jamaicensis* is, in the development of the ♂-antenna, the highest species, the long pectinations being an exaggeration of the short side-processes or feeble dilatations found in the other members of the genus *Sphinx*.

Calasymbolus was originally proposed for *astylus*, but later on employed by Butler and also by Grote himself for nearly all the American eyed Hawk Moths.

Grote's subgenus *Copismerinthus* has no justification whatever. When the author learned from Fernald's *Sphingidae of New England* that *cerisyi* had the foretibia armed at the end with a claw or thorn, he thought this to be something quite characteristic, not being aware that the European *ocellata*, which he considered the type of *Smerinthus*, possessed the same armature. In the same paper Grote states, as he had done in previous articles, that *ophthalmicus* from California is, in America, the only representative of the typical genus *Smerinthus*. This *ophthalmicus* is, however, nothing else but the Pacific form of *cerisyi*, differing *very slightly* from the eastern specimens of this species, and having the thorn at the end of the foretibia just like eastern *cerisyi*. *Sph. ocellata* and *cerisyi* are closely related, and can by no means be separated generically unless one proposes a genus for each species. Grote holds now the same opinion.* Tutt, *l.c.*, goes even farther than did Grote: he considers the local forms of *cerisyi* to represent two genera ! !

The thorn or claw at the end of the foretibia is here not a character of generic value. This is best proved by *ocellata* and *planus*, which are very near each other in every respect; the former, however, possessing the claw, the latter being without it—a difference entirely overlooked by lepidopterists.

The abdominal segments are said by Fernald, *l.c.*, to be unarmed. Grote and Smith have repeated this erroneous statement.

Key to the species:

a. Foretibia with an apical thorn (claw)	. . .	*b*.
Foretibia without an apical thorn (claw)	. . .	*d*.
b. Hindwing with a large black anal patch which is round and includes a pale blue ring or some pale blue spots	. . .	*c*.
Hindwing before anal angle with two resp. three black bars separated and bordered by grey or buff bars	. . 268.	*Sph. kindermanni*.
c. The space encircled by the blue ring of the eye-patch more or less shaded with bluish grey	. . . . . 270.	*Sph. ocellata*.
The space black, the ring often incomplete, sometimes represented by separate spots	. . . . . 272.	*Sph. cerisyi*.
d. The blue ring of the eye-patch complete, large, the space encircled by it more or less shaded with pale blue	. . 271.	*Sph. planus*.
The blue ring incomplete or represented by separate spots	. . . . .	*e*.
e. Brown antemedian band of forewing strongly angulate in middle	. . 273.	*Sph. jamaicensis*.
Brown antemedian band of forewing slightly curved	. . . . . 269.	*Sph. caecus*.

The two American species and the Asiatic *caecus* have a high subapical ridge on the inner surface of the clasper, while the other three (Palaearctic) species have the ridge merely indicated by a slight fold.

* Ent. *Record* vii. p. 56 (1895).

268. Sphinx kindermanni.

**Smerinthus kindermanni* Lederer, *Verh. Zool. Bot. Ges. Wien.* ii. p. 22 (1852) (Argana Maden, Kurdistan ;—Mus. Tring) ; Ersch., *Fedtsch.'s Reise Lep.* p. 26. n. 81. t. 2. f. 19 (♀) (1874) (Turkestan).

Calasymbolus kindermanni, Butler, *Trans. Zool. Soc. Lond.* ix. p. 592. n. 5 (1877) (Pontus).

Eusmerinthus kindermanni, Grote, *Canad. Ent.* ix. p. 132 (1877) ; id., *Bull. Buffalo Soc. N. Sci.* iii. p. 223 (1877).

Cypa kindermanni, Hampson, *Journ. Bombay N. H. Soc.* xiii. p. 38. n. 96 (1900) (Kandahar ; Chitral).

♂ ♀. Anterior tibia ending in a thorn, which is mostly covered with scales. Antenna or ♂ subpectinate, the lateral projections about half as long as the segments are broad dorsally. Pulvillus reduced, decidedly smaller than in *ocellata* and *caecus*, varying in size, largest in the most western form.

♂. Tenth tergite apically broader than in *ocellata*, obtuse ; the sternite longer. Dorsal edge of clasper internally with the trace of a stronger chitinised longitudinal ridge before the end ; harpe (Pl. XXXIV. f. 26) as in *ocellata* with a single, somewhat spoon-shaped, apical process, ventral margin shallowly sinuate, upper edge continued dorso-basad, ending in a rather high crest, which is situated below a longitudinal subdorsal fold clothed with long dispersed bristles. Penis-sheath with a conical tooth at the end, membrane of duct with a patch of pale spines.

♀. Vaginal plate resembling that of *ocellata*, proximally still less chitinised ; the ridge before the cavity with a broader mesial sinus.

Larva known only from Kandahar, Afghanistan ; similar to *ocellata* (see *Sph. kind. obsoleta*).

Hab. Taurus, Cilicia, eastwards to the Altai region, East Turkestan, Afghanistan, Chitral.

Three subspecies, which are connected by intergradations.

a. Sph. kindermanni kindermanni.

**Smerinthus kindermanni* Lederer, *l.c.* (1852) (Kurdistan) ; Staud., *Cat. Lep. Eur.* p. 17. n. 26 (1861) ; id., *l.c.* ed. ii. p. 37. n. 484 (1871) (Pont. m.) ; Ersch., *l.c.* (1874) (partim) ; Staud., *Hor. Soc. Ent. Ross.* xiv. p. 300 (1878) (Taurus) ; Rom., *Mém. Lep.* i. p. 72 (1884) (Lenkoran ; Grand Ararat ; Helenendorf) ; Gr.-Grschim., in Rom., *Mém. Lép.* iv. p. 512. n. 207 (1890) ; Teich, *Stett. Ent. Zeit.* lvii. p. 30 (1896) (Ararat ; larva on *Salix*) ; Holtz, *Illustr. Zeitschr. Ent.* ii. p. 63 (1897) (Taurus, Asia min.) ; Bartel, in Rühl, *Grossschm.* ii. p. 168 (1900) (partim) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 100. n. 728 (1901) (partim).

Calasymbolus kindermanni, Butler, *Trans. Zool. Soc. Lond.* ix. p. 592. n. 5 (1877) (Pontus).

♂ ♀. The western form. The dark markings of the forewing reddish-brown. Pulvillus larger than in the two other subspecies, black ; the ridge formed by the upper edge of the harpe beneath the longitudinal fold of the clasper rough with teeth or tubercles.

Hab. Asia Minor eastward to the Caucasus.

In the Tring Museum 2 ♂♂ from : Helenendorf ; "Transkauk., type" ex coll. Felder.

In the Leech collection 2 ♂♂ without locality.

b. Sph. kindermanni orbata.

Smerinthus kindermanni, Erschoff, *l.c.* (1874) (partim) ; Crüger, *Stett. Ent. Zeit.* xxxv. p. 393 (1875) ; Christ., in Rom., *Mém. Lép.* v. p. 11. n. 38 (1889) (Askhabad, one ♀, very pale) ; Bartel, in Rühl, *Grossschm.* ii. p. 168 (1900) (partim) ; Staud. & Reb., *l.c.* (1901) (partim).

**Smerinthus kindermanni* var. *orbata* Groum-Grschim., *l.c.* iv. p. 512. n. 207 (1890) (Ferghana ;—Mus. Tring) ; Bartel, *l.c.* p. 169 (1900) (Turkestan).
Eusmerinthus kindermanni, Kirby, *Cat. Lep. Het.* p. 712. n. 1 (1892) (Turkestan).
Eusmerinthus kindermanni var. *orbata*, id., *l.c.* p. 712. sub n. 1 (1892).

♂♀. Paler than the preceding, the dark bands of the forewing less tawny. Pulvillus small and pale. The ridge formed basally by the upper edge of the clasper smooth. This is the form generally found in collections as *kindermanni*, and distributed as such by the German dealers. It varies in colour to a certain extent, some specimens coming near the preceding, others near the following.

Hab. Transcaspia, Turkestan, North Afghanistan.

In the Tring Museum 10 ♂♂, 8 ♀♀ from : Margelan ; Ruschke, Afghanistan; Sefir-Kuh.

c. Sph. kindermanni obsoleta.

Eusmerinthus kindermanni, Butler, *Proc. Zool. Soc. Lond.* p. 413. n. 26. t. 39. f. 11 (*p.*). 12 (*l.*) (1880) (Kandahar) ; Swinh., *Proc. Zool. Soc. Lond.* p. 346. n. 3 (1885) (Kandahar, vi.-viii.).
Smerinthus kindermanni, Cotes & Swinhoe, *Cat. Moths Ind.* i. p. 27. n. 151 (1887) (Kandahar).
Cypa kindermanni, Hampson, *Journ. Bombay N. H. Soc.* xiii. p. 38. n. 96 (1900) (Kandahar ; Chitral).
**Smerinthus kindermanni* var. *obsoleta* Staudinger, in Staud. & Reb., *Cat. Lep.* ed. iii. p. 100. sub n. 728 (1901) (Korla ;—coll. Staudinger).

♂. Similar to the palest specimens of *orbata*. The discal lines of the forewing a little less distinct, the pale antemedian and discal bands more whitish ; the anal patch of the hindwing less sharply marked, and the underside paler in tint, with some of the lines less distinct than in *orbata*. We have not observed any difference in structure from *orbata*.

Larva described by Roberts (see Butler, *l.c.*) as having yellow side-bands, white granules, a blue, green-tipped, curved horn.—Food : *Salix*, vi.

Hab. Eastern Turkestan ; Chitral ; Kandahar.

In the Tring Museum 2 ♂♂ from Maral-bashi, east of Kashgar, May.

In the British Museum from Kandahar and Chitral.

269. **Sphinx caecus.**

Smerinthus caecus Ménétriés, *Enum. Corp. Anim. Petr., Lep.* ii. p. 135. n. 1560. t. 13. f. 2 (1857) (Dauria ? : Amur ;—Mus. St. Petropolis) ; id., *Mél. Biol. Ac. St. Pétersb.* i. p. 48. n. 109 (Separ.) (1859) (Amur) ; Graes., *Berl. Ent. Zeitschr.* xxxii. p. 105. n. 190 (1888) (*l.* on *Salix*) ; Staud., in Rom., *Mém. Lép.* vi. p. 236. n. 225 (1892) (Amurland ; Askold ; i. E. vi., *l.* viii.) ; Bartel, in Rühl, *Grossschm.* ii. p. 166 (1900) (Transbaikal. ; East Siber. ; Amur ; Dauria ; N. China ; Askold) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 100. n. 727 (1901) (Amur ; Ussuri ; ? Daur.).
Smerinthus? caecus, Standinger, *Cat. Lep. Eur.* ed. ii. p. 37. n. 485 (1871) (var. of *kinderm.?*).
Smerinthus coecus (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 40. n. 30 (1875).
Calasymbolus caecus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 592. n. 4 (1877) (Amur).
Eusmerinthus coecus (!), Grote, *Canad. Ent.* ix. p. 132 (1877) ; id., *Bull. Buffalo Soc. N. Sci.* iii. p. 223 (1877).
Eusmerinthus caecus, Kirby, *Cat. Lep. Het.* i. p. 712. n. 2 (1892) (Dauria ; Amur).

♂♀. Anterior tibia without a thorn at end. Antenna of ♂ subpectinate as in *kindermanni*. Pulvillus well developed.

♂. Tenth tergite nearly as in *cerisyi*, but sinuate at apex ; sternite as slender as in *cerisyi*. Clasper a little narrower than in *cerisyi*, with a dorso-apical rounded ridge placed obliquely as in *cer. cerisyi* ; harpe ventrally emarginate before end, apex and upper edge of the harpe densely beset with short spines. Penis-sheath

(Pl. XXIX. f. 47, drawn from the opposite side as figs. 42—44 to show tooth and patches of spines) armed with a sharp subapical tooth which points somewhat proximad; besides this tooth there are two patches of short acute spines, one on the sheath, the other on the membrane of the duct; penis-funnel (P-F) carinate ventrally as in *cerisyi*, with the sides sinuate.

♀. Vaginal plate short, orifice very large, its proximal edge slightly elevate and incrassate, sinuate; no special armature.

Larva similar to that of *ocellata*, not described.—Food-plant: *Salix*.

Hab. Transbaikalia to Askold and N. China.

In the Tring Museum 7 ♂♂, 7 ♀♀ from the Amur Region.

270. **Sphinx ocellata.**

Sphinx ocellata Linné, *Syst. Nat.* ed. x. p. 489. n. 1 (1758).
Sphinx semipavo Retzius, *Gen. Ins.* p. 35. n. 33 (1783).
Sphinx salicis Hübner, *Samml. Eur. Schm., Sphing.* t. 15. f. 73 (1805—).

♂♀. Anterior tibia ending in a thorn.

♂. Tenth abdominal tergite triangular (Pl. XXII. f. 14), extreme end curved downwards, obtusely rounded, not pointed; sternite with a triangular lobe, which is feebly curved upwards, with the underside convex and the sides dilated in basal third, apex blunt. Clasper irregularly sole-shaped, broadly rounded at end; harpe (Pl. XXXIV. f. 25) longitudinal, elongate, simple, the edges slightly elevate, the surface more or less concave, apex narrowed, the upper edge shallowly emarginate. Penis-sheath (Pl. XXIX. f. 41) armed at end with a heavy conical tooth projecting laterad; the membrane of the duct bears a patch of curved spines, which are often concealed.

♀. Vaginal plate not strongly chitinised, much wrinkled, but fairly constant; the orifice preceded by a transverse ridge, forming the lower or anterior lip of the cavity, this ridge mesially indented.

The harpe of the hybrids *ocellata* × *populi* is often sinuate ventrally before the apex; this sinus corresponds to the deep apical sinus of *populi*, dividing the harpe of this species into two lobes; the narrowed apical portion of the *ocellata*-harpe is, therefore, homologous to the upper lobe of the harpe of *populi*.

Larva somewhat variable, occasionally with red side patches; bluish green, granules white; seven white or yellowish side-bands, horn blue at base, or entirely grey-blue.—Food-plants: *Salix*, *Populus*, *Pirus*, *Prunus*, rarely other trees.

Pupa somewhat glossy, rugose, not distinctly granulated; cremaster broad basally, rough; laterally with pointed tubercles.

One brood, seldom two.

Hab. Palaearctic Region as far east as Western Siberia and Asia Minor; not found in Greece.

Two subspecies:

a. Sph. ocellata ocellata.

Hoefn., *Archet.* ii. t. 5 (1592); id., *Dir. Ins.* t. 10 (1630); Moufet, *Theatr. Ins.* p. 91. f. 3 (1634); Merian, *Eur. Ins.* ii. t. 37 (1683); Rajus, *Hist. Ins.* p. 148. n. 2. p. 149. n. 3 (1710); Albin, *Nat. Hist. Engl. Ins.* t. 8 (1720); Roes., *Ins. Belust.* i. cl. 1. *Pap. Noct.* p. 1. t. 1. f. 3. 4 (1746); Wilke, *Engl. Moths.* cl. 1. s. b. p. 10. t. 5 (1747); Uddm., *Diss.* p. 58. taf. (1753); Hemmerich, *Coll. Cur. Ins.* t. 7. f. b (175); Geoffr., *Hist. Ins.* ii. p. 79. n. 1 (1762); Goed., *Metam.* i. p. 65. t. 24. & iii. p. 25. t. 0 (1662-69); Gronov., *Zoophyl.* p. 201. n. 816 (1764); Seba, *Thesaur.* iv. t. 59. f. 4. 5. 6 (1765); Schaeff., *Icon.* t. 99. f. 5. 6 (1766); Harris, *Aurelian* t. 5. fig. g. h. i.

(1766) ; Admir., *Ins.* t. 1 (1774) ; Ebert, *Naturl.* iii. p. 91. t. 36. f. 1. 2. 3 (1778) ; Ernst & Engram., *Ins. Eur.* iii. p. 114. t. 119. f. 164 d - g (1782).

Sphinx ocellata Linné, *Syst. Nat.* ed. x. p. 489. n. 1 (1758) ; id., *Fauna Suec.* ed. ii. p. 286. n. 1083 (1761) ; Sulz., *Kennz.* p. 36. t. 15. f. 89 (1761) ; Poda, *Mus. Graec.* p. 80. n. 2 (1761) ; Sepp, *Nederl. Ins.* i. 3. p. 11. t. 2. f. 6. 7 (1762) ; Scop., *Ent. Carn.* p. 182. n. 465 (1763) ; Linné, *Mus. Lud. Ulr.* p. 341 (1764) ; Müll., *Fauna Frid.* p. 37. n. 341 (1764) ; Hufn., *Berl. Mag.* ii. p. 178. n. 4 (1766) ; Linné, *Syst. Nat.* ed. xii. p. 796. n. 1 (1767) ; Houtt., *Naturl. Hist.* i. 11. p. 397. n. 1 (1767) ; Beckm., *Epit.* p. 160. n. 1 (1772) ; Goeze, *Beun. Abh.* p. 95. n. 10 (1773) ; Mart., *Allg. Gesch. Nat.* i. p. 77 (1774) ; Müll., *Naturs.* v. 1. p. 635. n. 1 (1774) ; Fuessl., *Verz. Schweiz. Ins.* p. 32. n. 611 (1775) ; Mein., *Naturf.* iv. p. 113 (1775) ; Harris, *Engl. Lep.* p. 30. n. 202 (1775) ; Fabr., *Syst. Ent.* p. 536. n. 1 (1775) (partim) ; Schiff. & Denis, *Wien. Verz.* p. 41. n. 1 (1776) ; Schröt., *Abh. Geg. Nat.* i. p. 180 (1776) ; Müll., *Zool. Dan.* p. 116. n. 1334 (1776) ; Mader, ed. Kleem., *Raupenkal.* p. 70. n. 197, p. 115. n. 322 (1777) ; Fuessl., *Mag. Ent.* i. p. 262 (1778) ; Leske, *Anfangsgr. Nat.* i. p. 457. n. 1 (1779) ; Esp., *Eur. Schm.* ii. p 27. t. 1 (1779) ; Blum., *Handb. Nat.* p. 364. n. 1 (1779) ; Goeze, *Ent. Beytr.* iii. 2. p. 135. n. 1 (1780) ; Fabr., *Spec. Ins.* ii. p. 139. n. 1. (1781) (partim) ; Fuessl., *N. Mag. Ent.* ii. p. 69 (1781) ; Lang, *Verz. Augsb.* p. 64. n. 533-5 (1782) ; Fourc., *Ent. Paris.* ii. p. 251. n. 1 (1785) ; Fuessl., *l.c.* iii. p. 148 (1786) ; Fabr., *Mant. Ins.* ii. p. 92. n. 1 (1787) (partim) ; Borkh., *Schmett. Eur.* ii. p. 104. n. 1 (1789) ; Gmel., *Syst. Nat.* i. 5 p. 2371. n. 1 (1790) (partim) ; Rossi, *Fauna Etr.* ii. p. 159. n. 1046 (1790) ; View., *Tabell. Verz. Brandenb.* p. 3. n. 1 (1790) ; Schwarz, *Raupenkal.* pp. 52. 194. 350. 493. 629 (1791) ; Brahm, *Insectenkald.* ii. 1. p. 430. n. 301 (1791) ; Petag., *Inst. Ent.* ii. p. 495. n. 1. t. 8. f. 1 (1792) ; Borkh., *Rhein. Mag.* i. p. 325. n. 149 (1793) ; Fabr., *Ent. Syst.* iii. 1. p. 355. n. 1 (1793) (partim) ; Prunn., *Lep. Ped.* p. 79. n. 164 (1798) ; Cederh., *Fauna Ingr.* p. 213. n. 651. t. 2. f. a (1798) ; Donov., *Brit. Ins.* p. 47. t. 269 (1799) ; Schrank, *Fauna Boica* ii. 1. p. 221. n. 1380 (1801) ; Walk., *Faune Paris Ins.* ii. p. 277 (1802) ; Thunb., *Mus. Nat. Ups.* xxiii. p. 10 (1804) ; Turt., *Syst. Nat.* iii. 2. p. 168 (1806) ; Shaw, *Gen. Zool.* vi. 1. p. 216. t. 72 (1806) ; Ochsenh., *Schm. Eur.* ii. p. 249. n. 2 (1808) ; Nagel, *Hülfsb. Schm.* p. 144 (1818) ; Latr., in *Nouv. Dict. Hist. Nat.* xxxi. p. 352 (1819) ; God., *Lep. France* iii. p. 68. n. 17. t. 20. f. 2 (1821) ; Rockstr., *Anweis. Schm.* p. 189. t. 7. f. 3. 4. 5 (1833) ; Beske, in Silberm., *Rev. d'Ent.* ii. p. 177 (1834) (Hamburg) ; Friv., *ibid.* ii. p. 181 (1834) (Hungary).

Sphynx (!) *ocellata*, Gleditsch, *Forstwissensch.* ii. p. 41. n. 12 (1775) ; Vogel, *Schm.-Cab.* i. p. 27. t. 7. f. 7 (1821) ; id., *l.c.* x. p. 10. t. 5. f. 2 (*l.*) (1829).

Sphinx semipavo Retzius, *Gen. Ins.* p. 35. n. 33 (1783).

Sphinx salicis Hübner, *Samml. Eur. Schm., Sphing.* t. 15. f. 73 (1805—) ; id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. Leg. n. a. f. 2a. b (1806-18).

Smerinthus ocellata, Latreille, *Hist. Nat. Crust. Ins.* iii. p. 401 (1802) ; id., *l.c.* xiv. p. 135. n. 2 (1805) ; id., *Gen. Ins. Crust.* iv. p. 209 (1809) ; Sam., *Ent. Comp.* p. 243 (1819) ; Boisd., *Ind. Meth.* p. 34 (1829) ; Lucas, *Lép. Eur.* p. 147. t. 49. f. 2 (1834) ; Treits., in Ochs., *Schm. Eur.* x. p. 263 (1834) ; Latr., in Cuv., *Règn. Anim., Ins.* t. 147. f. 1 (1836) ; Thon, *Naturg. Schm.* p. 109. t. 55. f. 750. 751. 752 (1837) ; Blanch., *Hist. Nat. Ins.* iii. p. 480 (1840) ; Ramb., *Faune Amlal.* p. 329 (1842) (Malaga) ; Korn., *Schm. Schles.* i. p. 19. n. 43 (1842) ; Eversm., *Fauna Volgo-Ural.* p. 114 (1844) (v. vi.) ; Herr.-Schæff., *Eur. Schmett.* ii. 1. p. 91. n. 33 (1847) ; Luc., *Lép. Eur.* p. 118. t. 49 (1848) ; Walk., *List Lep. Ins. B. M.* viii. p. 240. n. 1 (1856) ; Assm., *Zeitschr. Ent. Bresl.* i. p. 5 (1857) ; Ménétr., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 94. n. 1559 (1863) (Livonia ; Petrop.) ; Doum., *Bull. Soc. Ent. France* p. 8 (1860) (teratol.) ; Siev., *Bull. Moscou* p. 140 (1862) (St. Pétersb.) ; Mann, *Wien. Ent. Monatschr.* vi. p. 66 (1862) (Brussa) ; Wall., *Skand. Hvt. Fjär.* p. 17 n. 3 (1863) ; Ball., *Bull. Moscou* p. 364 (1864) (Gorki) ; Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Snell., *Vlind. Nederld.* p. 101. n. 1 (1867) ; Tengstr., *Act. Soc. F. F. Fenn.* x. p. 6. n. 97 (1869) ; Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 76 (1870) (Breda) ; Brutt., *Progr. Gymn. Dorpat* p. 24. n. 11 (1872) (v.-vii.) ; Siebke, *Enum. Ins. Norv.* iii. p. 25. n. 2 (1874) ; Butl., *Trans. Zool. Soc. Loud.* ix. p. 592. n. 1 (1877) ; Staud., *Hor. Soc. Ent. Ross.* xiv. p. 300 (1878) (Asia min.) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 45 (1880) ; Weil., *Progr. Oberrealsch. Innsbr.* p. 15 (1880) ; Albr., *Bull. Moscou* p. 379 (1882) (Moscow) ; Auriv., *Kongl. Vet. Ac. Handl.* xix. 5. p. 126. n. 159 (1882) (recens. *Lep. Mus. Lud. Ulr.*) ; Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 240 t. 7. f. 70 (1882) (larva) ; Poult., *Trans. Ent. Soc. Lond.* p. 290 (1885) (postembr. devel.) ; id., *l.c.* p. 137 (1886) ; Lampa, *Ent. Tidskr.* vi. p. 27. n. 120 (1885) ; Kroul., *Bull. Soc. Oural.* xi. p. 214. n. 90 (1885) (Sarapoul, v.) ; Haar, *Tijdschr. Ent.* xxix. p. 30 (1886) (Alblasserward) ; Amel., *Berl. Ent. Zeitschr.* xxxi. p. 262 (1887) (Dessan) ; Mina-Pal. & Failla-Ted., *Nat. Sic.* vii. p. 42 (1889) (if occ. in Sicily ?) ;

Hofm., *Raup. Grossschm.* p. 30. t. 8. f. 6 (1893) ; id., *Grossschm. Eur.* p. 31. n. 3. t. 18. f. 5 (1894) ; Kill. & Cafl., *Jahrb. Nat. Ges. Graub.* xxxviii. *App.* p. 20 (1895) ; Vos, *Tijdschr. Ent.* xli. p. 80 (1898) (Apeldoorn) ; Bart., in Rühl, *Grossscl.* ii. p. 171 (1900) (Europe, Asia min., Transc. ; West. Siber.) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. n. 726 (1901) (partim) ; Tutt, *Brit. Lep.* iii. p. 424 (1902).

Laothoë ocellata, Fabricius, in Illig., *Mag. Ent.* vi. p. 288. n. 42 (1807).

Paonias salicis Hübner, *Verz. bek. Schm.* p. 142. n. 1519 (1822).

Smerinthus ocellatus (!), Stephens, *Illustr. Brit. Ent., Haust.* i. p. 112 (1828) ; id., *Cat. Brit. Ins.* ii. p. 30 (1829) ; Westw. & Humphr., *Brit. Moths* i. p. 7. t. 1. f. 1. 2. 3 (1843) ; Boisd., *Chen. Eur., Sphing.* t. 7. f. 2. 3. 4 (1852-43) ; id., *Spec. Gén. Lép. Hét.* i. p. 31. n. 20 (1875) ; Kirby, *Cat. Lep. Het.* i. p 711. n. 1 (1892) (Europe ; N. & W. Asia) ; Barrett, *Lep. Brit. Isl.* ii. p. 3. n. 1. t. 41. f. 1. a.—d. (1895) (Engl.. S. Scotl., Ireld.).

Merinthus (!) *ocellatus* (!), Meigen, *Hamlb. Schm.* p. 102. n. 20 (1827) ; id., *Syst. Beschr. Eur. Schm.* ii. p. 148. n. 1 (1830).

Smerynthus (!) *ocellata*, Cantener, in Silberm., *Rev. d'Ent.* i. p. 77 (1833) (Dép. du Var, iv. vii. =*salicis*).

Dilina ocellata, Zetterstedt, *Ins. Lapp.* p. 917 (1840).

**Smerinthus ocellata* var. *cinerascens* Staudinger, *Stett. Ent. Zeit.* xl. p. 316 (1879) (Naryn ;—coll. Staudinger) ; id , in Rom., *Mém. Lép.* vi. p. 237. sub n. 226 (1892) ; Bartel, *l.c.* 176 (1900) ; Staud. & Reb., *l.c.* p. 99. sub n. 726 (1901) (Naryn).

Smerinthus salius (!), Hofmann, *Raup. Grossschm.* p. 30 (1893) (*sub syn.*).

Smerinthus ocellata ab. *rosea* Bartel, *l.c.* p. 176 (1900).

Smerinthus ocellatus × *populi*, Westwood, *Brit. Moths* p. 7 t. 1. f. 10 (1843) ; Barrett, *Lep. Brit. Isl.* t. 41. f. 2 (1895) ; Hause, *Trans. Ent. Soc. Lond.* p. 193 (1843) ; Westw., *ibid.* p. 195. t. 2. f. 1 (1843).

Smerinthus ocellata × *populi*, Bellier, *Bull. Soc. Ent. France* p. 5 (1863).

Smerinthus ocellata hibr. *hybridus* Stephens, *List Brit. Anim. Brit. Mus.* v. p. 26 (1850) ; Staud., *Cat. Lep. Eur.* p. 16. sub n. 27 (1861) ; id., *l.c.* ed. ii. p. 37. sub n. 487 (1871) ; Bartel, in Rühl, *Grossschm.* ii. p. 176 (1900).

Smerinthus ocellata, Wiskott, *Festschr. Ver. Schles. Ins.* (*Sep.*) p. 19. n. 68. t. 3. f. 5 (1897) (gynandr.) ; Schultz, *Illust. Zeitschr. Ent.* ii. p. 393 (1897) (gynandr.) ; Bartel, *l.c.* p. 174 (1900).

Smerinthus ocellata × *populi*, Briggs, *Entom.* p. 217 (1881) ; Wisk., *l.c.* p. 19. n. 69. t. 3. f. 8 (1897) ; (gynandr.) ; Schultz, *l.c.* p. 395 (1897) ; Bartel, *l.c.* p. 177 (1900).

Smerinthus ocellata hybr. *hybridus*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 99. sub. n. 726 (1901) ; Tutt, *Brit. Lep.* iii. p. 392 (1902).

Smerinthus tiliae × *ocellata* = *leoniae* Standfuss, *Bull. Soc. Ent. France* p. 86 (1901).

Smerinthus ocellata ab. *pallida* Tutt, *l.c.* p. 427 (1902).

The individuals from the Ural and South Russia which we have examined do not seem to us to be different from the examples of Central and Western Europe. Dr. Staudinger, *l.c.*, described as *cinerascens* a South Russian individual which he considered to represent a desert form. This individual is certainly different from all others we have seen, but we do not believe that it is anything else but an abnormal specimen ; anyhow, a single example from a particular place is certainly not sufficient to base a geographical race upon if the individuals from the surrounding countries are of the ordinary type.

The ♂ of *ocellata* copulates in confinement comparatively easily with the ♀ of *Amorpha populi*. The offspring of such a union stand in structure, shape, and colour, intermediate between the parent species. The thorn at the end of the foretibia is short, mostly concealed under the scaling, the penis-sheath resembles that of *populi*, the teeth of the duct are either partly or all replaced by fine bristles ; the harpe agrees better with that of *ocellata*, being, however, longer and slenderer.

Authentic offspring of the reverse union are now also known, Standfuss's experiments having at last been successful in so far as he reared two ♀♀ of this hybrid. The statement appearing in various books that the hybrid *populi* × *ocellata* is identical with *populi* has, as a matter of course, no foundation. The specimens

formerly sold by Standinger as being this hybrid, if they really did not differ from *populi* as stated by Standfuss and Standinger, were doubtless true *populi*. The collector from whom Standinger received these "hybrids" may have been taken in. The name *inversa* of Tutt, *l.c.*, refers to these specimens, not to the true hybrid *populi* × *ocellata*.

The ♀ *populi* × *ocellata* kindly lent to us by Standfuss agrees much better with *populi* than with *ocellata*. The eye-spot of *ocellata* is represented by a blackish shade.* The thorn at the end of the foretibia of *ocellata* is here vestigial. The frenulum is reduced but distinct. The most remarkable feature of the specimen is the antennae, which have rather long seriated ciliae, which is not the case in the ♀♀ of either parent-species. Does this mean reversion to a former state of development? One of our two ♀♀ *ocellata* × *populi* has similar antennae.

The hybrid *Mimas tiliae* × *Sphinx ocellata* is a very interesting product obtained by Professor Standfuss in some numbers. We have seven ♂♂ of this hybrid. They come in appearance nearer the ♂-parent than the ♀-parent, but only in appearance. In structure they are decidedly nearer *ocellata*. As the structure does not seem to have been closely compared, we give the following results of our investigation:

1. In *ocellata* the foretibia ends in a prominent thorn, which is absent from *tiliae*; the hybrid possesses the thorn, though somewhat stunted.
2. The tibiae are not spinose in *ocellata* and densely spinose in *tiliae*; there are no spines in the hybrid.
3. The proximal pair of hindtibial spurs is absent from *ocellata*, and present in *tiliae*; these spurs, in the hybrid, are absent, or are represented by two small tubercles, or are distinct but shorter than in *tiliae*. The apical spurs, which are much shorter in *ocellata* than in *tiliae*, are intermediate in the hybrid, both being sometimes of the same length.
4. The retinaculum and frenulum are normal in *tiliae*, and vestigial respectively absent from *ocellata*. The hybrid agrees with *ocellata* in the absence of a retinaculum, but has a long, thin, weak frenulum.
5. Sexual armature (only one specimen dissected): the tenth tergite of the hybrid stands intermediate between those of *ocellata* and *tiliae*; the harpe is almost like that of *ocellata*, differing essentially from that of *tiliae*; the penis-sheath has no armature, differing from that of either parent-species.

Hab. Europe as far west and north as Ireland, Scotland, Lapland; southward to Andalusia and Sicily; eastward to the Ural, Transcaucasia, and Asia Minor. Not found in Greece.

In the Tring Museum a series of larvae and pupae and 40-odd specimens, besides 16 ♂♂ and 2 ♀♀ *ocellata* × *populi*, and 1 ♀ *populi* × *ocellata*.

b. Sph. ocellata atlanticus.

Smerinthus ocellata var., Lucas, *Bull. Soc. Ent. France* p. 92 (1856) (Algérie).
Smerinthus ocellatus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 31. n. 20 (1875) (partim; Algéric).
Smerinthus ocellata, Oberthür, *Et. d'Ent.* vi. p. 65 (1881) (Oran).
**Smerinthus atlanticus* Austaut, *Le Natural.* xii. p. 190 (1890) (Oudja); Kirby, *Cat. Lep. Het.* i. p. 711. n. 2 (1892) (Morocco); Aust., *l.c.* xv. p. 72 (1893) (larva); Rothsch., Nov. Zool. i. p. 98 (1894) (not distinct); Bartel, in Rühl, *Grossschm.* ii. p. 178 (1900) (Algier, iv.; Nord Morocco).
**Smerinthus atlanticus* var. *aestivalis* Austaut, *l.c.* xii. p. 191 (1890); Bartel, *l.c.* p. 180 (1900).

* This shade is very conspicuous in the second ♀, which is now in the Tring Museum.

Smerinthus ocellata var. *atlanticus*, Staudinger & Reb., *Cat. Lep.* ed. iii. p. 99. sub n. 726 (1901) (Maur. or.).

**Smerinthus austauti* × *atlanticus* = hibr. *metis* Austaut, *l.c.* xv p. 230 (1893); Bartel, *l.c.* p. 181 (1900).

**Smerinthus austauti* × *atlanticus* = hibr. *metis* ab *deleta* Austaut, *l.c.* p. 231 (1893); Bartel, *l.c.* p. 183 (1900).

Smerinthus atlantica × *populi* = hybr. *fringsi* Standfuss, *Bull. Soc. Ent. France* p. 87 (1901).

Smerinthus atlantica × *austauti* = hybr. *oberthueri* Tutt, *Brit. Lep.* iii. p. 393 (1902).

♂♀. A large North African form, corresponding to the equally enlarged edition of *populi* of the same countries. The harpe is longer and distally narrower than in *ocell. ocellata*, the conical tooth of the penis-sheath heavier, more strongly curved, almost elbowed.

The specimen named *aestivalis* by Austaut is in the Tring Museum; the difference between it and ordinary specimens of *atlanticus* is very slight. The series of hybrids *austauti* × *atlanticus* in the Tring Museum (11 specimens) exhibits considerable variation; in some the russet-tawny colour of the hindwing has nearly disappeared; the grey centre of the black patch of the hindwing is often transverse, of irregular shape, rarely circular; the antemedian line bordering the dark discal area of the forewing is often angulate behind the base of M^2.

Larva and pupa similar to those of *ocell. ocellata*, but the head of the former dark green, the horn uniformly grey-blue.

Hab. North Africa: Algiers and North Morocco.

In the Tring Museum 3 ♂♂, 5 ♀♀ (including Austaut's types of *atlanticus* and *aestivalis*) from Meridje, S. Algiers; 8 ♂♂, 3 ♀♀ *austauti* × *atlanticus*; 2 ♂♂ *atlanticus* × *populi*.

271. Sphinx planus.

**Smerinthus planus* Walker, *List Lep. Ins. B. M.* viii. p. 254. n. 18 (1856) (N. China;—Mus. Brit.); Boisd., *Spec. Gén. Lép. Hét.* p. 33. n. 22 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 593. n. 3. t. 92. f. 11 (1877) (N. China; Shanghai; larva shortly descr.); Kirby, *Cat. Lep. Het.* i. p. 711. n. 4 (1892) (China; Japan; = *argus*); Bartel, in Rübl, *Grossschm.* ii. p. 169 (1900) (East Siberia; Amur; Korea; China; Japan).

Smerinthus argus Ménétriés, *Enum. Corp. Anim. Mus. Petr.* ii. p. 136. n. 1561. t. 13. f. 3 (1857) (Amur;—Mus. St. Petropolis); id., *Mél. Biol. Ac. St. Pétersb.* i. p. 48. n. 110 (1859) (Amur); Staud., *Cat. Lep. Eur.* ed. ii. p. 37. n. 486 (1871) (Amur); Boisd., *l.c.* p. 32. n. 21 (1875) (var. of *ocell.* ?); Butl., *l.c.* n. 4 (1877); Oberth., *Et. d'Ent.* v. p. 26. n. 65 (1880) (Askold, vii.); id., *Bull. Soc. Ent. France* p. 56 (1886) (Manchuria, viii., *l.* on *Salix*); Graes., *Berl. Ent. Zeitschr.* xxxii. p. 106. n. 191 (1888) (*l.* on *Populus*, rarely *Salix*); Fixs., in Rom., *Mém. Lép.* iii. p. 322. n. 99 (1889) (Corea, vi.).

Smerinthus argus (*ocellata* var. ?), Staudinger, in Rom., *Mém. Lép.* vi. p. 236. n. 223 (1892) (Amur-land; China; Japan; = *ocellata* var ?).

Smerinthus ocellatus, Leech (*non* Linné, 1758), *Proc. Zool. Soc. Lond.* p. 587. n. 26 (1888) (Yokohama; Gensan; Kiukiang); id., *Trans. Ent. Soc. Lond.* p. 119. n. 91 (1889) (= *argus*; Kiukiang); id., *l.c.* p. 278. n. 39 (1899) (Yokohama; Gensan; Kiukiang; Chang-Yang).

Smerinthus ocellata var. *planus*, Staudinger & Reb., *Cat. Lep.* ed. iii. p. 100. sub n. 726 (1901); Tutt, *Brit. Lep.* iii. p. 428 (1902).

In opposition to Leech, who pronounced *planus* to be identical with *ocellata*, Staudinger maintained that there were some differences between the two in colour and pattern which justified the separation of *planus* from *ocellata*, if not as a species, at least as a "good" geographical race. The distinguishing characters pointed out by Staudinger in 1892 were subsequently said by Leech to be quite unreliable. Writers on Palaearctic Lepidoptera mention *planus* generally as doubtfully distinct, or as a slightly different form of *ocellata*. It is very curious that *not one* of the

authors who expressed an opinion on these insects has noticed that the well-known thorn at the end of the foretibia of *ocellata* is absent from *planus*! Besides this very obvious difference, which some authors might be inclined to treat as of generic value, we mention that the antenna of the ♂ is decidedly longer and thicker than in specimens of *ocellata* of the same size. The genital armature of the ♂ is similar to that of *ocellata*, but the tenth tergite is longer, the sternite broader, the harpe narrower, and the conical tooth of the penis-sheath stouter and longer, often bearing one or more small teeth. The vaginal plate also agrees with that of *ocellata*; the transverse ridge in front of the orifice, however, is not incised mesially. These genital differences are not very conspicuous, but they become more important if we consider that there is as close an affinity also between the genital armature of *ocellata* and *kindermanni*, which insects nobody will venture to treat as specifically identical. *Ocellata* and *planus* have originated from the same form, but they have become so different that they could doubtless exist together in the same place without losing their independence, or, in other words, without fusing into one species.

Larva pale green, with white or yellowish side-bands.—Food-plants: *Populus*, *Salix*.

Hab. Eastern Siberia to Central China and Japan.

In the Tring Museum 2 pupae, 12 ♂♂, 8 ♀♀ from: Yokohama, July, August; Amurland; China.

272. **Sphinx cerisyi.**

Smerinthus cerisyi Kirby, in Richards., *Fauna Bor.-Amer.* iv. p. 301. n. 1. t. 4. f. 4 (1827).

♂ ♀. Anterior tibia produced into a thorn at the end. Pulvillus large. Antenna of ♂ rather larger than in *ocellata*, subpectinate, the segments being dorso-laterally more obviously dilated, the ventral outline of the segments (in side-view) less straight than in *ocellata*, the apical ciliae rather longer; the median segments of the ♀-antenna a little longer than broad. The eye-spot has three blue markings, the first often obsolete, the second and third mostly forming a ring.

♂. Tenth tergite (Pl. XXII. f. 15) rounded at end, broad, slightly bent downwards, concave beneath, the side-edges somewhat undulate; sternite with a triangular lobe, individually variable, slender as a rule. Clasper narrower than in *kindermanni*, with a prominent dorsal subapical ridge (which is rudimentary in *kindermanni*), this process projecting mesiad (Pl. XXXIV. f. 27), different in some of the subspecies; harpe irregularly triangular, more or less pointed; below the concave incrassate dorsal edge of the clasper there is a prominent longitudinal fold. Penis-sheath with an apical tooth, conical, projecting laterad (Pl. XXIX. f. 42); duct with a patch of spines as in *ocellata*.

♀. Vaginal plate small, membranous, anterior edge of the vaginal orifice not stronger chitinised than the sides, not forming a ridge, the orifice covered by the seventh sternite, lying in a deep membranaceous cavity without any special armature.

Larva pale-green, side-stripes yellowish white; horn blue, tip black.—Food-plant: *Salix*.

Chrysalis not described.

Apparently two broods in the southern districts, the second most likely irregular.

Hab. Canada to Mexico, California, and Vancouver Island; not recorded from Florida, Louisiana, or Texas.

The four geographical forms of *cerisyi*—the species was named after Cerisy, the spelling *cerysii* and *cerisii*, therefore, is not correct—are not sharply defined. The most distinct of them is the southern one from Mexico and Arizona. There is nothing or very little in the genital organs by which to distinguish the subspecies. The subapical ridge of the clasper is triangular or rounded, not so obviously spatulate as represented by Smith, *l.c.* The two broods of *astarte* as well as of *ophthalmica* are said to be different; further researches are necessary to prove that there is really seasonal variation in this species.

a. Sph. cerisyi cerisyi.

Smerinthus cerisyi Kirby, in Richards., *Fauna Bor.-Am.* iv. p. 301. n. 1. t. 4. f. 4 (1827) (N. Am.); Streck., *Lep. Rhop. Het.* p. 52. 59. t. 7. f. 3 (♂) (1873) (Rhode I.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 35. n. 25 (1875); Beth., *Canad. Ent.* xi. p. 151 (1879); Fern., *ibid.* xvi. p. 21. (1884) (Orono, Maine, very rare, at light, E. v.); Cross, *Ent. News* vii. p. 297 (1896) (N. Hampsh., rare); Hanh., *Canad. Ent.* xxxi. p. 50 (1899) (Manitoba, v.); Heath, *ibid.* xxxii. p. 93 (1900) (Manitoba, vi.); Tutt, *Brit. Lep.* iii. p. 285 (1902).

Smerinthus cerisii (!), Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 291. sub n. 4 (1839) (probably = *geminatus*); Grote, *Proc. Ent. Soc. Philad.* v. p. 40 (1865) (dist. from *geminatus*); id. & Rob., *ibid.* v. p. 160. n. 67 (1865) (Atlantic distr.); Grote, *Bull. Buffalo Soc. N. H.* i. p. 23 (1873); id., *l.c.* ii. p. 227. n. 43 (1875); Peck, *Canad. Ent.* viii. p. 120 (1876) (Maine, ♀); Bailey, *Canad. Ent.* x. p. 120 (1878) (Center, N.Y., 24. iv.); Fern., *Sphing. N. Engld.* p. 78. n. 39 (1886) (Orono, Maine, v.); Grote, *Canad. Ent.* xviii. p. 133. n. 47 (1886) (Can., Maine, N.Y.).

Smerinthus geminatus, Walker (*non* Say, 1824), *List Lep. Ins. B. M.* viii. p. 246. n. 7 (1856) (partim); Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 183. n. 87 (1859) (partim); Morris, *Cat. Lep. N. Am.* p. 20 (1860) (partim); Lintn., *Ent. Contr.* ii. p. 124 (1873).

Calasymbolus cerisii (!), Butler, *Trans. Zool. Soc. Lond.* ix. p. 592. n. 3 (1877) ("not in B. M.").

Eusmerinthus cerisii (!), Grote, *Canad. Ent.* ix. p. 132 (1877); id., *Bull. Buffalo Soc. N. H.* iii. p. 223. n. 44 (1877) (Hudson Bay Territory); Kirby, *Cat. Lep. Het.* i. p. 712. n. 4 (1892) (Hudson Bay).

Calasymbolus Copismerinthus cerisii (!), Grote, *Hawk Moths N. Am.* p. 35 (1886) (v. vi.).

Smerinthus cerysii (!), Smith, *Trans. Amer. Ent. Soc.* xv. p. 223. 234. t. 11. f. 7 (genit.) (1888) (Can; N.Y.; Maine; Rhode I.).

♂♀. The lines of the forewing sharply marked; a series of brown postdiscal lunules, which are more arched than in the other forms. Dorso-apical ridge of clasper rounded, more obliquely placed than in the following subspecies; tooth of penis-sheath acute, rather obviously oblique. The first blue spot of the eye-mark mostly small, the second and third sometimes separate, but mostly joined together in front.

Hab. Canada, N. England, N. York, Rhode Island.

In the Tring Museum 4 larvae, 5 ♂♂, 1 ♀ from: Maine; Oncouta, N. York, June; Uland, N. York, July; Winnipeg, Manitoba, July; St. Louis, Saskatchewan (Conbeaux).

b. Sph. cerisyi astarte.

Smerinthus astarte Strecker, *Proc. Ac. N. Sci. Philad.* xxxvi. p. 283 (1884) (Colorado;—coll. Strecker); Smith, *Trans. Amer. Ent. Soc.* xv. p. 223. 234 (1888) (Colorado); Edw., *Ent. Amer.* iii. p. 223 (1888).

Smerinthus cerysii form *astarte*, Smith, *l.c.* p. 240. sub n. 78 (1888).

Eusmerinthus astarte, Kirby, *Cat. Lep. Het.* i. p. 712. n. 5 (1892) (Colorado).

♂♀. Very close to the preceding, from which it is not always distinguishable. The distal margin of the forewing less sharply dentate, the brown marginal area narrower, the postdiscal brown lunules less curved. Harpe more symmetrical than

in the following one, ventral process of penis-funnel more prominent. One of our specimens has the ring of the eye-spot filled in with blue.

Hab. Colorado to Lake Superior, probably in all the States west of the Mississippi except the Pacific Coast Region, which is occupied by *ophthalmica*.

In the Tring Museum 9 ♂♂, 6 ♀♀ from various places in Colorado, June and July (Oslar).

c. Sph. cerisyi ophthalmica.

**Smerinthus ophthalmica* Boisduval, *Bull. Soc. Ent. Fr.* p. 32 (1855) (Calif. ;—coll. Charles Oberthür ; non "Mexico").

Smerinthus ophthalmicus (!), Clemens, *Journ. Ac. N. Sci. Philad.* iv. p. 185. n. 88 (1859) (var. of *geminatus?*) ; id., in Morris, *Syn. Lep. N. Am.* p. 211. n. 5 (1862) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 160. n. 68 (1865) (Western distr.) ; Boisd., *Ann. Soc. Ent. Belg.* xii. p. 67. n. 72 (1869) ; Grote, *Bull. Buffalo Soc. N. H.* i. p. 23 (1873) ; id., *l.c.* ii. p. 227. n. 41 (1875) ; Lintn., *Ent. Contr.* ii. p. 125 (1873) ; Edw., *Proc. Calif. Ac. Sci.* v. p. 91 (1876) ; id., *l.c.* vii. p. 21 (1877) (larva) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 592. n. 2 (1877) (Calif. ; *non* "Mexico") ; Grote, *l.c.* iii. 223. n. 42 (1877) (Calif.) ; Butl., *Papilio* i. p. 104 (1881) ; Grote, *Canad. Ent.* xviii. p. 133. n. 50 (1886) (Calif.) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 221 (1888) (Cal. ; Vanc. ; Oreg. ; Washingt. ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 43 (1889) (lit. rel. to metam.) ; French, *Canad. Ent.* xxiii. p. 143 (1891) (larva and pupa); Beutenm., *ibid.* p. 200 (1891) (larva).

Smerinthus opthalmicus (!), Morris, *Cat. Lep. N. Am.* p. 20 (1860) ; Strecker, *Lep. Rhop. Het.* p. 52 (1873) ; id., *l.c.* p. 58. t. 7. f. 4. (♂). 5. (♀) (1873) (Calif. ; Washingt..

Smerinthus ophtalmicus (!) Boisduval, *Spec. Gén. Lép. Hét.* i. p. 33. n. 23. t. 1. f. 1 (*l.*) (1875) (Calif. ; larva).

**Smerinthus vancouverensis* Butler, *l.c.* sub. n. 2 (1877) (Vancouver I. ;—Mus. Brit.).

Smerinthus cerysii form *ophthalmicus*, Smith, *l.c.* p. 240 (1888).

Smerinthus ophthalmicus var. *vancouverensis* (!), Smith, *l.l.c.c.*

Smerinthus vancouverensis (!), Kirby, *Cat. Lep. Het.* i. p. 711. n. 3 (1892) (Vancouver).

♂♀. Harpe slender distally, asymmetrical, almost pointed ; dorso-apical ridge of clasper triangular, more or less obtuse (Pl. XXXIV. f. 27) ; tooth of penis-sheath sharp, rather long, slightly oblique. Variable in the ground-colour, generally paler than *astarte*, from which the darker individuals do not seem to be distinguishable.

a'. Sph. cerisyi ophthalmica f. *ophthalmica.*

Synonymy as above. Forewing above ashen grey.

b'. Sph. cerisyi ophthalmica f. *pallidulus.*

Smerinthus pallidulus, var., Edwards, *Proc. Calif. Ac. Sci.* vi. p. 91 (1876) (Calif.).

Smerinthus ophthalmicus var. *pallidulus* Grote, *Bull. Buffalo Soc. N. H.* iii. p. 223. sub n. 42 (1877) (Calif.) ; id., *Canad. Ent.* xviii. p. 133. n. 50 (1886) ; Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 174 (1892) (*types* of Hy. Edwards).

Forewing above more or less grey-vinaceous-cinnamon.

The two forms are not seasonal according to the dated material examined.

Hab. South California to Vancouver I.

In the Tring Museum 17 ♂♂, 16 ♀♀ from : California ; Oregon ; Washington.

d. Sph. cerisyi saliceti.

Smerinthus ophthalmica Boisduval, *l.c.* (1855) (Mexico, *non* Calif.).

Smerinthus ophthalmicus id., *Ann. Soc. Ent. Belg.* xii. p. 67. n. 72 (1869) ; Butl., *l.c.* (1877) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 17. n. 1 (1881) (partim ; Mexico).

**Smerinthus saliceti* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 35. sub n. 23 (larva notic.) and n. 24 (1875) (Mexico ; – coll. Charles Oberthür) ; Druce, *l.c.* i. p. 17. n. 2. t. 1. f. 9 (1881) (fig. of *type*) ; Kirby, *Cat. Lep. Het.* i. p. 711. n. 6 (1892) ; Druce, *l.c. Suppl.* p. 310 (1896) (Durango ; Guadalajara).

Nicholsonia saliceti, Tutt, *Brit. Lep.* iii. p. 386 (1902).

♂♀. The three blue spots of the eye-patch are separate, distinct, the second straight, linear or elliptic, not curved towards the third spot. Harpe short ; dorso-apical ridge of clasper high, triangular, process of penis-funnel and tooth of penis-sheath short. The Arizona specimens are very pale.

Hab. Mexico ; Arizona.

In the Tring Museum 8 ♂♂, 4 ♀♀ from : Phoenix and Mt. San Francisco, Arizona, March, April, July (Dr. Kunze ; Oslar) ; Guadalajara, August (Schaus) ; Mexico City.

273. Sphinx jamaicensis.

Sphinx ocellatus jamaicensis Drury, *Illustr. Ex. Ent.* ii. p. 43. t. 25. f. 2. 3 (1773) ("Jamaica," *loc. err.?*) ; Goeze, *Ent. Beytr.* iii. 2. p. 217. n. 45 (1780) ; Harris, in Sill., *Journ. Sci. Art* xxxvi. p. 291 (1839) (=*geminata?*).

Sphinx ocellata, Fabricius (*non* Linné, 1758), *Syst. Ent.* p 536. n. 1 (1775) (partim) ; id., *Spec. Ins.* ii. p. 139. n. 1 (1781) (partim) ; Gmel., *Syst. Nat.* i. 5. p. 2371. n. 1 (1790) (partim) ; Fabr., *Ent. Syst* iii. 1. p. 355. n. 1 (1793) (partim).

Smerinthus geminatus Say, *Amer. Ent.* i. p. 25. t. 12 (1824) ; Gosse, *Canad. Natural.* pp. 280. 295 (1840) (larva, pupa) ; Walk., *List Lep. Ins. B. M.* viii. p. 246. n. 7 (1856) (syn. partim ; Orilla, W. Can.) ; Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 183. n. 87 (1859) (syn. partim ; Illin. ; Mass. ; Penn.) ; Morris, *Cat. Lep. N. Am.* p. 20 (1860) (partim) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 210. n. 4 (1862) (partim) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 160. n. 66 (1865) (Atlantic distr.) : Pack., *Guide Study Ins.* p. 275 (1869) ; Bowl., *Canad. Ent.* iii. p. 143 (1871) (Quebec, vi.–vii.) ; Lintn., *Ent. Contr.* i. p. 179 (1872) (N. York) ; id., *l.c.* p. 192 (1872) (N. Y., viii.) ; id., ii. p. 119 (1873) (life hist.) ; Streck., *Lep. Rhop. Het* pp. 51. 56. t. 7. f. 6 (♂). 7 (♀) (1873) ; Grote, *Bull. Buffalo Soc. N. H.* i. p. 23 (1873) ; Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., viii.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 39. n. 29 (1875) (descr. of larva) ; Caulf., *Canad. Ent.* vii. p. 241. n. 6 (1875) (Montreal, vi.) ; Grote, *l.c.* ii p. 227. n. 42 (1875) ; Hulst, *Bull. Brooklyn Ent. Soc.* i. p. 67 (1878) ; id., *l.c.* ii. p. 35 (1879) ; Reed, *Rept. Ent. Soc. Ontario* xii. p. 62 (1882) (larva) ; Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O., common) ; Hill, *ibid.* iii. p. 27 (1883) (Adirondacks, 2200 ft. vii.) ; Fern., *Canad. Ent.* xvi. p. 21 (1884) (Maine, common at light, vi.) ; id., *Sphing. N. Eng.* p. 77 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 219. t. 11. f. 9 (genit.) (1888) (Can. to Virg., Illin., Kentucky ; Jamaica?) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 43 (1889) (lit. rel. to metam.) ; French, *Canad. Ent.* xxiii. p. 143 (1891) (larva and pupa, diff. from *ophth.*) ; Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y., electr. light) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 313. t. 7. f. 3 (1895) (*l.*, *p.*, *i.*, food-plants ; "fig. 4" *err.*) ; Brehm, *Ent. News* viii. p. 21 (1877) (Newark, eggs May 1) ; Trum., *ibid.* p. 28 (1897) (S. Dakota) ; Hanh., *Canad. Ent.* xxix. p. 292 (1897) (Manitoba) ; Rowl., *Ent. News* ix. p. 190 (1898) (Mississippi, common ; *Populus* ; pupa black) ; Hanh., *l.c.* xxxi. p. 50 (1899) (Manitoba, v. vii.).

Smerinthus geminata (!), Harris, in Sill., *Journ. Sci. Art* xxxvi. p. 291. n. 4 (1839).

Smerinthus gemina (!), Boisduval, *Bull. Soc. Ent. France* p. 32 (1855).

Smerinthus excaecatus, Lintner, *Proc. Ent Soc. Philad.* iii. p. 665 (1864) (larva, pupa).

Calasymbolus geminatus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 592. n. 2. (1877) (W. Canada ; U. St.).

Eusmerinthus geminatus, Grote, *Canad. Ent.* ix. p. 123 (1877) ; id., *Bull. Buffalo Soc. N. H.* iii. p. 223. n. 43 (1877) (Can. ; Mass. ; N. Y. ; Penn.) ; Kirby, *Cat. Lep. Het.* i. p. 712. n. 3 (1892) (N. Am.).

Calasymbolus Eusmerinthus geminatus, Grote, *Hawk Moths N. Am.* p. 35 (1886) (vi. vii., *l.* on *Rosaceae*, *Salix*) ; id., *Canad. Ent.* xviii. p. 133. n. 48 (1886) (Can. southw.).

♂♀. Anterior tibia without apical thorn ; spur of anterior tibia shorter than in the other species, its fringe weak, often obliterated. The eye-patch of the hind-wing differing essentially from that of the other species in the third blue spot (the

most distal one) being much more proximal and not arched ; the first spot generally absent, sometimes also the second. The species is rather variable in pattern individually. The posterior part of the disc of the forewing, distally of the angulated antemedian band, is sometimes occupied by reddish brown patches ; the pale border of the hindwing is often flushed with rosy red.

♂. Antenna shorter than in the other species, pectinate, the branches long, the segments short, with the ventral parts strongly compressed. Tenth segment of abdomen not essentially different from that of *cerisyi*, the tergite more dilated in the middle ; the lobe of the sternite very slender. Clasper (Pl. XXXIV. f. 28) narrower than in *cerisyi*, the apex less evenly rounded ; dorso-apical ridge rounded, placed somewhat obliquely, appearing to be much more ventral than in *cerisyi* owing to the clasper being dilated dorsad ; harpe short, rough with tubercles at the end ; the incrassate proximal part of the ventral edge of the harpe produced into a high triangular ridge, of which the edges are turned dorsad, so that the ridge has the appearance of a solid conical process in a ventral view. Penis-funnel produced ventrally into a long, pointed process (Pl. XXIX. f. 43) ; penis-sheath strongly chitinised at the end on one side, with *two* strong conical teeth ; patch of spines within the sheath vestigial.

♀. Antenna not pectinate, the lateral expansion indicated by a subdorsal curved carina on each segment ; the segments *shorter* than broad or high, laterally somewhat rounded in a dorsal or ventral view, ventrally carinate ; bristles prominent, ciliae short. Vaginal plate short, membranaceous ; vaginal cavity large, transverse, the edge incrassate at the side corners to a subglobose tubercle, anterior edge not elevated.

According to the number of blue spots in the eye-patch of the hindwing the following forms have been distinguished :

a'. Sph. jamaicensis f. ab. *jamaicensis*.

Sphinx ocellatus jamaicensis Drury, *l.c.* ; id., ed. Westw., *l.c.* ii. p. 47. t. 25. f. 2. 3 (1837) (fig. mala).
Smerinthus jamaicensis, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 160. n. 65 (1865) ("Jamaica").
Smerinthus geminatus var. *jamaicensis*, Lintner, *Ent. Contr.* ii. p. 122 (1870) ; Streck., *Lep. Rhop. Het.* p. 57. t. 7. f. 8 (♀) (1873) (Baltimore) ; Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O.) ; Kunze, *Ent. News* v. p. 315 (1894) (Arizona).
Paonias myops, Butler, *Trans. Zool. Soc. Lond.* p. 591. n. 2 (1877) (partim).
Calasymbolus Eusmerinthus geminatus var. *jamaicensis*, Grote, *Hawk Moths N. Am.* p. 36 (1886).
Eusmerinthus jamaicensis, Kirby, *Cat. Lep. Het.* i. p. 712. n. 5 (1892) (Jamaica?).

The first and second blue spots of the eye-mark absent.

b'. Sph. jamaicensis f. norm. *geminatus*.

Synonymy see above. First spot absent, second and third well developed.

c'. Sph. jamaicensis f. ab. *tripartitus*.

Calasymbolus Eusmerinthus geminatus var. *tripartitus* Grote, *Hawk Moths N. Am.* p. 36 (1886).

First spot very small but not absent, second and third well developed.

We are not at all sure that the name *tripartitus* refers to this species. Grote, when proposing the name, had no material of this third form, but based the name upon information derived from books quoting verbally from Fernald, who mentions in his *Sphingidae of New England*, *l.c.*, that "occasionally a third blue spot appears on the black." We do not know whether Fernald had himself seen "a third spot,"

or whether he relied upon former authors. Of these Hulst says that occasionally a third spot is indicated by a few scales, while Clemens and Packard state that the eye-mark has "two or three blue pupils." Clemens, however, confounded *cerisyi* and *jamaicensis*; the "three blue pupils" being referable, in our opinion, to *cerisyi*, the "two blue pupils" to *jamaicensis* f. norm. *geminatus*. If Fernald's statement of the occurrence of a third spot in *jamaicensis* is based upon actual observation, or is a loose repetition of Hulst's statement, then *tripartitus* of Grote is the name of the aberrant specimens of *jamaicensis* which have the first spot indicated; if Fernald, however, derived his information from Clemens, *tripartitus* is a mere synonym of *cerisyi*. We refer to this matter especially with a view of showing that precision is no less necessary when introducing a new name than when describing a new fact.

Larva pale green, granules the same colour or whitish, side-bands pale yellow, the last bright yellow; horn bluish.—Food-plants: Cherry and other *Prunus*, as well as a variety of other trees.

Pupa glossy, abdomen punctured, the punctures here and there connected by corrugations.

Hab. Newfoundland, Canada to Virginia and Arizona, Iowa.

Drury's locality "Jamaica" was erroneous. Several N. York species of Fothergill's collection were said by Drury to be from Jamaica, while others that came undoubtedly from Jamaica were represented as being from New York (see *P. brontes*, p. 89).

Several authors have referred to the "one-spotted" specimens as var. *jamaicensis*. If the name *jamaicensis* is to be employed for some specimens, it must be employed for the whole species as well. Those who object to the name on the ground of it being a misnomer may console themselves with the fact that there is a place Jamaica in the State of New York.

In the Tring Museum 4 larvae, 1 pupa, 63 ♂♂, 31 ♀♀ from Newfoundland to Georgia and Colorado.

LXXXII. CALASYMBOLUS.—Typus: *astylus*.

Sphinx, Drury (*non* Linné, 1758), *Illustr. Ex. Ent.* ii. Index (1773).
Paonias Hübner, *Verz. bek. Schm.* p. 142 (1822) (partim; includes *ocellata*, type of *Sphinx*).
Smerinthus, Lepelletier & Serville (*non* Latreille, 1802), *Enc. Méth.* x. p. 441 (1825).
Calasymbolus Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 23 (1873) (*nom. indescr.!*); id., *l.c.* iii. p. 223 (1877) (type: *astylus*).

♂♀. Very close to *Sphinx*, from which it differs in the high crest of the head and the peculiar shape of the hindwing.——Foretibia without thorn at apex. Scaling of head raised to a crest between the antennae. Costal margin of hindwing distally dilated frontad into a broadly rounded, more or less prominent lobe, vein C following the curve of the margin. Eye-patch of hindwing with one blue spot, which is generally central, seldom standing near the proximal edge of the patch.

♂. Antenna and tenth abdominal segment in structure essentially as in *Sph. ocellata*. Clasper without the dorso-apical ridge found in the American species of *Sphinx*, its dorsal margin nearly straight (Pl. XXXIV. f. 28. 29. 30); harpe with a single, bluntly rounded, distal lobe, its upper edge more or less sinuate before end and rough with tubercles or spines proximally of the sinus. Penis-funnel much more extended ventrad than in *Sphinx*, produced ventrally into a conical process

which is widely separated from the penis-sheath (Pl. XXIX. f. 38. 39. 44); the latter with one or two teeth.

♀. Middle segments of antenna higher than long. A ridge in front of the vaginal cavity strongly chitinised, mesially sinuate or cleft (Pl. XV. f. 18. 19).

Larva and pupa essentially as in *Sphinx*.—Food: *Prunus* and other trees.

Hab. Nearctic Region east of the Mississippi basin, in Canada extending further west.

The abdomen is said by Fernald, from whom Grote and Smith have copied the statement, to be without spinules; in this the Professor was wrong (see above under *Sphinx*), the abdomen agreeing in spinulation with that of *Sphinx*.

We have not seen a specimen of any of the three species of this genus in which there was an indication of more than one blue spot in the eye-patch of the hindwing. The only spot present varies in size and position. With which of the three original spots is it homologous? Does it correspond to the first, second, or third spot of the species of *Sphinx*? We find among *Sph. jamaicensis* specimens with only one central blue spot: is this the same as the spot of *Calasymbolus*? A comparison of the various species reveals the true homology. The three grey lines of *Sph. kindermanni*, separated by black scaling, which represent the more ancestral form of the eye-patch, are pale blue in *Sph. cerisyi saliceti* and remain separate; the second and third become arched, join each other in front, and form a more and more complete ring in the other subspecies of *cerisyi*, the first spot disappearing at the same time more or less. In *ocellata*, which is very closely allied to *cerisyi*, the ring is always complete and the first spot has entirely disappeared. The same is the case in *planus*. If we bear this in mind and compare now the hybrid *astylus* × *ocellata* we observe at once that the ring of this hybrid consists of the spot of *astylus* and the outer part of the ring of *ocellata*, which part is the *third* spot of *cerisyi saliceti*; therefore the spot of *astylus* must either be the second or the first spot of *saliceti*, *i.e.*, the spot of *Calasymbolus* is not the spot of *Sph. jamaicensis* f. ab. *jamaicensis* (see above), the blind eye of this *jamaicensis* and of *Calasymbolus* are not homologous in respect to their pupil. Further, if the *Calasymbolus* pupil were the first spot of *saliceti*, in the union *astylus* × *ocellata* all three spots would be present and should be represented at least by some blue scales in the offspring of such a union. This is not the case in the hybrids examined, and we conclude, therefore, that the pupil of *astylus* (and the other *Calasymbolus*) is homologous to the proximal part of the ring of *ocellata*, *i.e.*, to the *second* spot or line of *kindermanni* and *cerisyi saliceti*, as explained above.

It would be very interesting to have the results of forced breeding on the lines of Prof. Standfuss's experiments. Such researches would doubtless result in the production of individuals of *Calasymbolus* with more than one blue spot in the eye-patch.

Key to the species:

a.	Fore- and hindwing scalloped . . .	274. *C. excaecata.*
	Fore- and hindwing not scalloped	*b.*
b.	Distal margin of forewing distinctly angulated at M^1, three distinct brownish lines with grey interspaces	275. *C. myops.*
	Distal margin of forewing not distinctly angulated at M^1; the discal lines quite indistinct, except at costal margin . .	276. *C. astylus.*

274. Calasymbolas excaecata.

Sphinx excaecata Abbot & Smith, *Lep. Georgia* i. p. 49. t. 25 (*l., p., i.*) (1797).

Paonias excaecatus, Hübner, *Verz. bek. Schm.* p. 142. n. 1521 (1822); Grote, *Bull. Buffalo Soc. N. H.* i. p. 23 (1873); Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., vi. Beg. vii.); Grote, *l.c.* ii. p. 226. n. 38 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 590. n. 1 (1877); Grote, *l.c.* iii. p. 223. n. 41 (1877) (Canada to Southern Sts.); Hill, *Papilio* iii. p. 27 (1883) (Adirondacks); Fisch., *Canad. Ent.* xvi. p. 17 (1884) (Buffalo; on *Salix* and *Tilia*); Fern., *ibid.* p. 21 (1884) (Orono, Maine, rare, vi.); id., *Sphing. N. Engld.* p. 73. n. 35. t. 6. f. 1 (1886); Grote, *l.c.* xviii. p. 133. n. 51 (1886) (Can. southw.); id., *Hawk Moths N. Am.* p. 36 (1886) (vi. vii., *l.* on *Rosaceae*, etc.); Smith, *Trans. Amer. Ent. Soc.* xv. p. 226. t. 11. f. 10 (genit.) (1888) (east. U. St., Canada, common, two broods); Beutenm., *Canad. Ent.* xxiii. p. 14 (1891) (metam., two broods); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N. Y., electr. light); Kirby, *Cat. Lep. Het.* i. p. 712. n. 1 (1892) (N. Am.); Cross, *Ent. News* vii. p. 297 (1896) (N. Hampsh., common); Hanh., *Canad. Ent.* xxix. p. 292 (1897) (Manitoba); Rowl., *Ent. News* ix. p. 189 (1898) (Mississippi; common; two broods; food; pupa brown); Fyles, *Rept. Ent. Soc. Ontario* xxx. p. 104 (1900) (Quebec).

Paonias pavonina Geyer, in Hübn., *Samml. Ex. Schm., Zutr.* p. 12. f. 835. 836 (1837).

Smerinthus excaecata, Harris, in Sill., *Journ. Sci. Art* xxxvi. p. 290. n. 1 (1839); id., *Ins. Inj. Veg.* p. 230 (1841); id., ed. Flint, *Ins. Inj. Veg.* p. 327. f. 155 (1862); Fitch, *Rept. Ins. N. York* iii. p. 341, in *Trans. N. Y. St. Agr. S.* xvi. (1856).

Paonias pavoninus, Grote, *Bull. Buffalo Soc. N. H.* i. p. 23 (1873) (= *excaec.?*); Kirby, *Cat. Lep. Het.* i. p. 713. n. 2 (1892) (Penn.).

Smerinthus excaecatus, Walker, *List Lep. Ins. B. M.* viii. p. 246. n. 8 (1856) (N. Y.; Can.; W. Can.); Clem., *Journ. Ac. N. Sci. Philad.* xv. p. 182. n. 85 (1859) (Penn.; Mass.; Georgia); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 208. n. 2 (1862); Lintn., *Proc. Ent. Soc. Philad.* iii. p. 665 (1864) (larva, pupa); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 160. n. 70 (1865) (Atlantic distr.); Reed, *Canad. Ent.* i. p. 40 (1869) (sound of larva); Pack., *Guide Study Ins.* p. 275 (1869) (descr. partly erron.); Bowl., *Canad. Ent.* iii. p. 143 (1871) (Quebec, vi., vii.); Lintn., *Ent. Contr.* i. p. 179 (1872) (N. York, larva); id., *l.c.* p. 192 (1872) (N. Y., vi.); Streck, *Lep. Rhop. Het.* p. 51. 54. t. 7. f. 1 (♂) 2 (♀) (1873) (Atlant. Sts.; Ohio; Kentucky; Indiana, etc.); Boisd, *Spec. Gén. Lép. Hét.* i. p. 38. n. 28 (1875); Caulf., *Canad. Ent.* vii. p. 241. n. 7 (1875) (Montreal, vi., vii.); Worth., *ibid.* p. 16 (1878) (Chicago, vi.); Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O., common); Fletch., *Canad. Ent.* xv. p. 203 (1883) (on *Pop. balsam.* and *alba*); Saund., *Ins. Inj. Fruits* p. 85. n. 31. f. 83 (*l.*). 84 (*i.*) (1883); id., *Canad. Ent.* xvi. p. 9. f. 1. 2 (1884) (life hist.); Beutenm., *Ent. Amer.* i. p. 196 (1885) (food-plants); Edw., *Bull. N. St. Nat. Mus.* xxxv. p. 43 (1889) (lit. rel. to metam.); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 314. t. 7. f. 4 (1895) (*l., p., i.*, food-plants); Heath, *Canad. Ent.* xxxii. p. 94 (1900) (Manitoba, vi.).

Smerinthus pavoninus, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 160. n. 69 (1865) ("Pennsylvania"); Boisd., *Spec. Gén. Lép. Hét.* i. p. 37. n. 27 (1875); Edw., *Ent. Amer.* iii. p. 223 (1888).

Smerinthus excoecatus (!), Soule, *Psyche* viii. p. 155 (1897) (*l.* on *Spiraea*, unusual food).

♂♀. Distal margins of both wings scalloped, the lobes of the forewing prominent; fringe white, brown at the tips of the veins.

♂. Antenna nearly as long as in *Sphinx cerisyi*, the lateral expansions prominent. Clasper almost evenly rounded at end (Pl. XXXIV. f. 29); harpe obviously sinuate dorsally before end, the lobe thus formed obliquely truncate, its upper angle rounded. Penis-sheath with two teeth before apex, close together, unequal; a patch of long thin spines, pointing proximad, on the membrane of the duct (Pl. XXIX. f. 44).

♀. Vaginal orifice large, anterior margin raised to a ridge which is deeply cleft mesially, the lobes thus formed prominent (Pl. XV. f. 19).

Larva pale green, deeper in tint below, side-bands yellowish, last one brighter, granules prominent; red spots, dorso- and ventro-lateral, varying in size, often absent.—Food-plants: on a great variety of trees, *Prunus* and other *Rosaceae*; *Corylus*; *Carpinus*; etc.

Pupa somewhat glossy, thorax rugate, abdomen punctured, more or less rugose.

Two broods.

Hab. Canada to Florida, westwards to the Mississippi basin. Common.

In the Tring Museum several larvae and pupae, 34 ♂♂, 16 ♀♀ from Canada to Florida.

275. Calasymbolus myops.

Sphinx myops Abbot & Smith, *Lep. Georgia* i. p. 51. t. 26 (*l., p., i.*) (1797).

Paonias myops, Hübner, *Verz. bek. Schm.* p. 142. n. 1520 (1822); Grote, *Bull. Buffalo Soc. N. H.* i. p. 23 (1873); Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., vii.); Grote, *l.c.* ii. p. 226. n. 39 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 594. n. 2 (1877) (syn. partim); Smith. *Trans. Amer. Ent. Soc.* xv. p. 227. t. 12. f. 4 (genit.) (1888) (Canada to Georgia, westw. to Mississippi); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y., electr. light); Cross, *Ent. News* vii. p. 297 (1896) (N. Hampsh., common); Hanh., *Canad. Ent.* xxix. p. 292 (1897) (Manitoba); id., *l.c.* xxxi. p. 50 (1899) (Manitoba, vi.).

**Smerinthus rosaceorum* Boisduval, *Spec. Gén.* i. t. 15. f. 4 (1836) (coll. Charles Oberthür).

Smerinthus myops, Lepelletier & Serv., in *Enc. Méth., Ins.* x. p. 441 (1825); Harris, in Sill., *Journ. Sci. Art* xxxvi. p. 291. n. 3 (1839) (=*rosaceorum*); Walk., *List Lep. Ins. B. M.* viii. p. 245. n. 5 (1856); Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 181. n. 84 (1859); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 207. n. 1 (1862); Harris, ed. Flint, *Ins. Inj. Veg.* p. 328 (1862); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 160. n. 71 (1865) (Atlantic distr.); Lintn., *Ent. Contr.* i. p. 192 (1872) (N. York. vii.); Streck., *Lep. Rhop. Het.* p. 51. 55. t. 7. f. 9 (♂) (1873); Caulf., *Canad. Ent.* vii. p. 241. n. 8 (1875) (Montreal, very rare); Boisd., *Spec. Gén. Lép. Hét.* i. p. 41. n. 32 (1875) (larva, pupa); Peck, *Canad. Ent.* viii. p. 239 (1876) (Maine, larva, wild cherry); Hulst, *Bull. Brooklyn Ent. Soc.* iii. p. 99 (1881); Reed, *Rept. Ent. Soc. Ontario* xii. p. 61 (1882) (larva); Saund., *Ins. Inj. Fruits* p. 208. n 111. f. 214 (*i.*) (1883); id., *Canad. Ent.* xvi. p. 9. f. 3 (*i.*) (1884) (life hist.); id., *Rept. Ent. Soc. Ontario* xv. p. 27 (1885) (larva); Bunk., *Canad. Ent.* xviii. p. 207 (1886) (larva variable); Fern., *Sphing. N. Engld.* p. 75. n. 36 (1886) (*l.* on cherry); Edw., *Bull. N. St. Nat. Mus.* xxxv. p. 43 (1889) (lit. rel. to metam.); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 315. t. 7. f. 5 (1895) (*l., p. i.*; cherry); id., *l.c.* viii. p. 297 (1896) (transf.; *Prunus*); Brehm, *Ent. News* viii. p. 21 (1897) (Newark, eggs May 20); Soule, *Psyche* viii. p. 155 (1897) (*l.* spots mauve col.); Rowl., *Ent. News* ix. p. 190 (1898) (Mississippi, rare).

Smerinthus myops var. *rosaceorum* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 42. sub n. 32 (1875).

Smerinthus cerasi id., *l.c.* p. 42. sub n. 32 (1875).

Smerinthus sorbi id., *l.c.*

(?) *Smerinthus liliastri* id., *l.c.*

Calasymbolus myops, Grote, *l.c.* iii. p. 223. n. 40 (1877) (N. Y.; Mass.; S. States); Hill, *Papilio* iii. p. 27 (1883) (Adirondacks); Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine, two specim.); Grote, *ibid.* xviii. p. 133. n. 47 (1886) (Can. southw.); Kirby, *Cat. Lep. Het.* i. p. 712. n. 6 (1892) (N. Am.).

Calasymbolus Calasymbolus myops, Grote, *Hawk Moths N. Am.* p. 35 (1886) (v., vii., *l.* on *Rosaceae*).

♂♀. Distal margin of forewing not scalloped, somewhat produced at SC^5 and M^1; that of hindwing even; fringe unicolorous. Border of hindwing sometimes very pale.

♂. Antenna shorter than in *excaecata*. Clasper and harpe nearly the same, but the sinus of the harpe deeper, the angle in front of it not rounded. Ventral process of penis-funnel shorter than in *excaecata*; penis-sheath with a very heavy apical tooth, which is divided into two unequal points (Pl. XXIX. f. 39A, lateral view; f. 39B, dorsal view).

♀. Antevaginal ridge not quite so deeply divided as in *excaecata*.

Larva similar to that of *excaecata*, granules much finer.—Food-plants; *Prunus cerasus* and other species of *Prunus*, *Rosaceae*.

Pupa smaller than that of *excaecata*, more glossy.

Hab. Canada to Georgia, westward to the Mississippi basin and Colorado ; rarer than the preceding species.

In the Tring Museum several larvae and pupae, 47 ♂♂, 19 ♀♀ from : N. Jersey ; Ohio ; Pennsylvania ; N. Georgia ; Colorado.

276. Calasymbolus astylus.

Sphinx astylus Drury, *Illustr. Ex. Ent.* ii. p. 45. t. 26. f. 2. Index (1773) (N. York) ; Goeze, *Ent. Beytr.* iii. 2. p. 217. n. 46 (1780).

Smerinthus io Gray, in Griff., *Anim. Kingd.* xv. t. 83. f. 2 (1832) ; Guér., *Icon. Règne Anim.* ii. t. 84 f. 2 (1829-44) ; Wils., in *Encycl. Brit.* ed. vii. p. 246. t. 236. f. 5 (1835).

Smerinthus integerrima Harris, in Hitchc., *Rept. Geol. Mass., App.* (1835).

Smerinthus astylus, Guérin, *l.c.* ii. p. 495 (1829-44) ; Harris, in Sill., *Journ. Sci. Art* xxxvi. p. 290 n. 2 (1839) (= *integerrima*) ; Emm., *Nat. Hist. N. York* p. 221. t. 40. f. 4 (1854) ; Walk., *List Lep. Ins. B. M.* viii. p. 245. n. 6 (1856) (N. York) ; Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 184. n. 89 (1859) (Mass. ; N. York) ; Morris, *Cat. Lep. N. Am.* p. 20 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 211. n. 6 (1862) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 160. n. 72 (1865) (Atlantic distr.) ; Streck., *Lep. Rhop. Het.* p. 51. 56. t. 7. f. 10 (♂) (1873) (N. York ; N. Jersey ; Penn. ; *l.* on *Vaccin.*) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 40. n. 31 (1875) (N. York ; larva) ; Peck, *Canad. Ent.* viii. p. 239 (1876) (Maine, larva) ; id., *l.c.* ix. p. 220 (1877) (N. Jersey) ; Fern., *Sphing. N. Engld.* p. 76. n. 37 (1886) (larva ; food-pl.) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 228. t. 11. f. 9 (genit.) (1888) (Can. to Mass. ; N. Y. ; N. J. ; Penn. ; larva on *Vaccin. corymb.*) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 44 (1889) (lit. rel. to metam.) ; Jones, *Ent. News* i. p. 21 (1890) (larva) ; Soule, *Psyche* vii. p. 191 (1895) ; Bentenm., *Bull. Amer. Mus. N. H.* vii. p. 316. t. 7. f. 6 (1895) (*l.*, *i.* ; food-plants) ; Soule, *l.c.* viii. p. 155 (1897) (*l.* on *Andromeda*, unusual food).

Calasymbolus astylus, Grote, *Bull. Buffalo Soc. N. H.* i. p. 23 (1873) ; Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., vii.) ; Grote, *l.c.* ii. p. 227. n. 40 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 591. n. 1 (1877) ; Grote, *l.c.* iii. p. 223. n. 39 (1877) (Mass. ; N. Y. ; Penn.) ; id., *Canad. Ent.* xviii. p. 133. n. 46 (1886) (Can. southw.) ; Kirby, *Cat. Lep. Het.* i. p. 713. n. 1 (1892) (N. Am.).

Calasymbolus Calasymbolus astylus, Grote, *Hawk Moths N. Am.* p. 35 (1886) (vi., vii., *l.* on *Vaccinium*).

Paonias astylus, Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N. Y., electr. light) ; Aich, *Ent. News* iv. p. 14 (1893) (N. Jersey, *l.* on *Gaylussacia frondosa* = dangleberry) ; Cross, *Ent. News* vii. p. 297 (1896) (N. Hampsh., rare) ; Erb., *ibid.* ix. p. 252 (1898) Newark, larva).

Smerinthus astylus × *ocellata* = *Smerinthus* var. *intersimus* Neumoegen, *Ent. News* v. p. 326 (1894).

♂ ♀. Antenna as short as in *myops*.

♂. Clasper (Pl. XXXIV. f. 30) apically less rounded than in the two other species ; harpe broader at end and more rounded, upper margin feebly concave before apex ; not distinctly sinuate. Penis-funnel as in *myops* ; penis-sheath with one tooth only (Pl. XXIX. f. 38).

♀. Vaginal orifice large, transverse, its anterior edge produced into a chitinised ridge, which is mesially sinuate (Pl. XV. f. 18), the two lobes of the ridge rounded.

Larva pale green ; head granulose all over as in *myops*, with a red side-stripe ; granules of head and body yellowish-white, prominent, their setae longer than in *myops* ; a series of red dorso-lateral spots : segment 1 with one posterior dot, segment 2 with a dot on each annulet, five altogether, forming a more or less complete stripe ; segment 3 with two, segment 4 with three dots, generally confluent to one spot, on the following six segments the spots become much larger, covering five or six annulets, the last two sometimes smaller than the preceding ones, segment 11 with two or three dots ; segments 5 to 10 are marked, moreover, with two red dorsal, elongate, somewhat comma-shaped markings, converging behind on each segment, and between them there is an indication of a red mesial line, a series of red stigmatal spots, variable in size, middle ones elongate, oblique, abdominal legs also spotted with red ; horn with very prominent tubercles, tip

divided, hinder surface red at base.—Food-plants: *Vaccinium corymbosum*, *Gaylussacia frindosa*, occasionally *Rosaceae*, *Andromeda*.

Pupa similar to that of *excaecata*.

Hab. Canada to N. York and Pennsylvania; a rare species.

The hybrid between this species and *Sphinx ocellata* was obtained by Mr. Rix and described by Neumoegen, *l.c.* We have three specimens of it, which show a mixture of the characters of *astylus* and *ocellata*. The thorn at the end of the anterior tibia is present, but is not so long as in *ocellata*. The specimens of Mr. Rix's brood were, apparently, all males. The eye-patch of this hybrid is of special interest (see above under *S. jamaicensis*).

In the Tring Museum 3 larvae, 1 pupa, 7 ♂♂, 3 ♀♀ from New Jersey and N. York; 3 ♂♂ *astylus* × *ocellata*.

LXXXIII. AMORPHA.—Typus: *populi*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim; type: *ocellata*).
Spectrum Scopoli, *Intr. Hist. Nat.* p. 413 (1777) (partim; incl. type of *Sphinx*).
Smerinthus Latreille, *Hist. Nat. Crust. Ins.* iii. p. 401 (1802) (partim; incl. type of *Sphinx*).
Laothoë Fabricius, in Illig., *Mag. Ent.* vi. p. 287. n. 42 (1807) (partim; incl. type of *Sphinx*).
Dilina Dalman, *Kongl. Vet. Ak. Handl.* xxxvii. p. 212 (1816) (partim; incl. type of *Sphinx*).
Polyptychus Hübner, *Verz. bek. Schm.* p. 141 (1822) (partim; type: *dentatus*).
Merinthus (!), Meigen, *Handb. Schm.* p. 101 (1829) (correct. of *Smerinthus!*).
Amorpha Hübner, *Tentam.* p. 1 (1806) (*nom. nud.* !); Kirby, *Cat. Lep. Het.* i. p. 710 (1892) (type: *populi*).

Close to *Sphinx*, from which it does not differ very obviously in structure. However, the two species, *populi* and *amurensis*, form a separate branch. Therefore we do not hesitate to treat them as generically distinct from the eyed *Sphinx*.

♂♀. Anterior tibia without apical thorn. Hindtibia with one pair of short spurs. Tibiae not spinose. Pulvillus and paronychium present. Retinaculum absent; frenulum also absent in ♂, but vestigial in ♀ (in *Sphinx* the frenulum of the ♂ is present, but reduced in length). Hindwing broad, costal angle broadly rounded, distal margin obliquely sinuate between C and SC^2, produced into a sinuate lobe at SC^2 and R^1, this lobe more prominent than the teeth at the other veins. Abdominal tergites spiny all over, the spines weak, very dense at and near the apical edges, covered with long scales. Thorax unicolorous; hindwing without eye-spot.

♂. Antennal segments feebly dilated laterad at the upper edge of the side-grooves; ciliae long. Harpe (Pl. XXXIV. f. 24) with two rounded lobes distally, both lobes visible in a ventral view of the end of the abdomen after the removal of some scales, projecting mesiad beyond the ventral edge of the clasper. Penis with spines at the edge of the sheath as well as upon the membrane of the duct (Pl. XXIX. f. 40).

♀. Vaginal plate without processes; the proximal edge of the vaginal cavity somewhat raised, wrinkled, more strongly chitinised than the rest of the vaginal area, mesially sinuate or emarginate.

Early stages essentially as in *Sphinx*, but pupa not glossy.—Food-plants: *Populus*, *Salix*.

Hab. Palaearctic Region, from Ireland to N. Africa and Amurland.

Two species.

277. Amorpha populi.

Sphinx populi Linné, *l.c.* p. 489. n. 2 (1758).
Spectrum populi, Scopoli, *l.c.* (1777).
Smerinthus populi, Latreille, *l.c.* (1802).
Laothoë populi, Fabricius, *l.c.* (1807).
Dilina populi, Dalman, *l.c.* (1816).
Polyptychus populi, Hübner, *l.c.* (1822).
Amorpha populi, Kirby, *l.c.* p. 710. n. 2 (1892).

♂♀. The widely distributed poplar-hawk has developed into three subspecies, of which the North African one is the most conspicuous. The three forms vary in colour in the same way from grey-olive-brown to grey-ochraceous. The weakening effect of in-breeding shows itself in this species very obviously by the loss of the dark pigment.

Hab. Palaearctic Region as far eastwards as Turkestan.

For hybrids see *Sphinx ocellata*.

a. A. populi austauti.

**Smerinthus austauti* Staudinger, *Pet. Nouv.* ii. p. 190 (1877) (Algiers ;—coll. Staudinger) ; Aust., *Le Natural.* ii. p. 11. 68. 85 (1879) ; Oberth., *Et. d'Ent.* vi. p. 65. t. 5. f. 1 (1881) (Algiers ; Morocco) : Cuis., *Bull. Soc. Ent. France* p. 120 (1887) (= *populi*) ; Bartel, in Rühl, *Grossschm.* ii. p. 196 (1900) (Algiers ; Morocco).
Smerinthus poupillieri Bellier, *Pet. Nouv.* ii. p. 193 (1878).
**Smerinthus austauti* var. *staudingeri* Austaut, *l.c.* ii. p. 85 (1879) (Mus. Tring); Oberth., *l.c.* p. 65. t. 4. f. 1 (1881) ; Bartel, *l.c.* p. 198 (1900).
**Smerinthus austauti* var. *incarnata* Austaut, *l.c.* iii. p. 237 (1880) (Meridié ; Tanger ;—Mus. Tring).
**Smerinthus austauti* var. *incarnata* ab. *mirabilis* Austaut, *l.c.* v. p. 359 (1883) (Morocco ;—Mus. Tring) ; Bartel, *l.c.* p. 199 (1900).
Amorpha austauti, Kirby, *Cat. Lep. Het.* i. p. 710. n. 1 (1892).
Amorpha austauti var. *a. Smer. austauti* var. *staudingeri*, id., *l.c.*
Amorpha austauti var. *b. Smer. austauti* var. *incarnata*, id., *l.c.*
Amorpha austauti var. *c. Smer. austauti* ab. *mirabilis*, id., *l.c.*
Smerinthus austauti var. *flava* Bartel, *l.c.* p. 198 (1900) (nom. max. supervac.).
Smerinthus populi var. *austauti* Standinger & Reb., *Cat. Lep.* ed. iii. p. 99. n. 725. c (1901) (Maur. oc.).
Amorpha populi var. *austauti*, Tutt, *Brit. Lep.* iii. p. 473 (1902).

♂♀. A large North African form, corresponding to *Sph. ocellata atlanticus*. Variable in ground-colour like the following race.

♂. Lobes of the harpe more triangular than in the European form, almost pointed ; the tenth tergite broader. Antenna more compressed, transsection more triangular than in the two other subspecies.

The types of the various individual varieties described by Austaut, and named with relish, are in the Tring Museum.

Hab. North Africa : Algiers ; Morocco.

In the Tring Museum 14 ♂♂, 12 ♀♀, including Austaut's types of *staudingeri*, *incarnata*, and *mirabilis*.

b. A. populi populi.

Aldrov., *Anim. Ins.* p. 252. t. 11. f. 3 (1602) ; Merian, *Eur. Ins.* iii. t. 37 (1717) ; Albin, *Nat. Hist. Eng. Ins.* t. 57 (1720) ; Linné, *Fauna Su.* ed. i. p. 249. n. 810 (1746) ; Wilke, *Engl. Moths* p. 11. t. 6 (1747) ; De Geer, *Mém.* i. p. 148. t. 8. f. 5 & ii. p. 243. n. 1 (1752) ; Roesel, *Ins. Belust.* iii. p. 187. t. 30. f. 1. 4 (1755) ; Hemmerich, *Coll. Cur. Ins.* t. 5. fig. a. b. (*l., l.*) (175-?) ; Geoffr., *Hist. Ins.* ii. p. 81. n. 3 (1762) ; Gronov., *Act. Helv.* v. p. 140. n. 309 (1762) ; id., *Zooph.* p. 201. n. 817 (1764) ; Seba, *Thesaur.* iv. t. 53. f. 21. 22. t. 59. f. 9. 10 (1765) ; Schaeff., *Ic. Rat.* t. 100. f. 5. 6 (1766) ; Harris, *Aurelian* t. 33. fig. d. f. g. (1766) ; Admiral, *Ins.* t. 10 (1774) ; Ernst. & Engr , *Ins. Eur.* iii. p. 106. t. 114. f. 162. d–f. t. 115. f. i–l. t. 116. f. n–p. (1782).

Sphinx populi Linné, *Syst. Nat.* ed. x. p. 489. n. 2 (1758) ; id., *Fauna Su.* ed. ii. p. 286. n. 1084 (1761) ; Sepp, *Nederl. Ins.* i. 3. p. 1. t. 1. f. 8. 9 (1762) ; Scop., *Ent. Carn.* p. 183. n. 466 (1763) ; Linné, *Mus. Lud. Ulr.* p. 342. n. 2 (1764) ; Müll., *Fauna Frid.* p. 37. n. 342 (1764) ; Hufn., *Berl. Mag.* ii. p. 178. n. 6 (1766) ; Houtt., *Naturl. Hist.* i. 11. p. 402. n. 2 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 797 n. 2 (1767) ; Beckm., *Epit.* p. 160. n. 2 (1772) ; Müll., *Naturs.* v. 1. p. 636. n. 2 (1774) ; Harris, *Engl. Lep.* p. 30. n. 204 (1775) ; Fuessl., *Verz. Schweiz. Ins.* p. 32. n. 612 (1775) ; Fabr., *Syst. Ent.* p. 537. n. 3 (1775) ; Müll., *Zool. Dan.* p. 116. n. 1335 (1776) ; Schiff. & Den., *Wien. Verz.* p. 41. n. 4. (1776) ; Mader, ed. Kleem., *Raupenkal.* p. 63. n. 179, p. 80. n. 230 (1777) ; Fuessl, *Mag. Ent.* i. p. 263 (1778) ; Esper, *Eur. Schmett.* ii. p. 34. t. 2, p. 177. t. 22. f. 2, p. 234. t. 36. f. 10 (1779) ; Goeze, *Ent. Beytr.* iii. 2. p. 139. n. 2 (1780) ; Fabr., *Spec. Ins.* ii. p. 141. n. 8 (1781) ; Stoll., in Cram., *Pap. Ex.* iv. p. 230. t. 398. f. A (1782) (gynandr.) ; Lang, *Verz. Augsb.* p. 64. n. 536, 537 (1782) ; Retz., *Gen. Ins.* p. 34. n. 32 (1783) ; Fourcr., *Ent. Paris* ii. p. 252. n. 3 (1785) ; Fuessl., *N. Mag. Ent.* iii. p. 147—163 (1786) ; Fabr., *Mant. Ins.* ii. p. 93. n. 8 (1787) ; Borkh., *Schmett. Eur.* ii. p. 106. n. 2 (1789) ; Gmel., *Syst. Nat.* i. 5. p. 2372. n. 2 (1790) ; View., *Tabell. Verz. Brand.* p. 3. n. 2 (1790) ; Rossi, *Fauna Etr.* ii. p. 160. n. 1017 (1790) ; Brahm, *Insectenkal.* p. 312. n. 198 (1791) ; Schwarz, *Raupenkal.* p. 630. n. 748 (1791) ; Borkh., *Rhein. Mag.* i. p. 325. n. 150 (1793) ; Fabr., *Ent. Syst.* iii. 1. p. 357. n. 9. (1793) ; Prunn., *Lep. Ped.* p. 81. n. 166 (1798) ; Donov., *Brit. Ins.* vii. p. 67. t. 241 (1798) ; Cederh., *Fauna Ingr.* p. 213. n. 652 (1798) ; Schrank, *Fauna Boica* ii. 1. p. 222. n. 1383 (1801) ; Thunb., *Mus. Nat. Ups.* xxiii. p. 10 (1804) ; Hübn., *Eur. Schmett., Sphing.* t. 15. f. 74 (1805–) ; id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. *Leg.* o. a. f. 1 a. b. (1806–18) ; Turt., *Syst. Nat.* iii. 2. p. 169 (1806) ; Ochsenh., *Schmett. Eur.* ii. p. 252. n. 3 (1808) ; Nagel, *Hülfsb. Schm.* p. 144 (1818) ; Latr., in *Nouv. Dict. Hist. Nat.* xxxi. p. 353 (1819) ; Godart, *Lép. France* iii. p. 71. n. 18. t. 20. f. 3 (1821) ; Beske, in Silberm., *Rev. d'Ent.* ii. p. 177 (1834) (Hamburg) ; Friv., *ibid.* p. 181 (1834) (Hungary).

Sphynx (!) *populi*, Gleditsch, *Forstwissensch* i. p. 540. n. 2, ii. p. 42. n. 13 (1775) ; Vogel, *Schm.-Cabin.* ii. p. 18 t. 7. f. 3. a. b (1822).

Sphinx tremulae Borkhausen, *Rhein. Mag.* i. p. 649. (1793) (Oberhessen).

Sphinx populei (!), Walckenaer, *Faune Paris. Ins.* ii. p. 277 (1802).

Smerinthus populi, Latreille, *Hist. Nat. Ins.* iii. p. 401 (1802) ; Sam., *Ent. Comp.* p. 243 (1819) ; Steph., *Illustr. Brit. Ent., Haust.* i. p. 112 (1828) ; id., *Cat. Brit. Ins.* ii. p. 30 (1829) ; Luc., *Lép. Eur.* p. 118. t. 49 (1834) ; Thon, *Naturg. Schm.* p. 110. t. 55. f. 753. 754. 755 (1837) ; Blanch., *Hist. Nat. Ins.* iii. p. 480 (1840) ; Ramb., *Faune Andal.* p. 329 (1842) (Malaga) ; Westw. & Humphr., *Brit. Moths* p. 7. t. 1. f. 4. 5. 6 (*i., p., l.*) (1843) ; Eversm., *Fauna Volga-Ural.* p. 115 (1844) (v., vi.) ; Herr.-Sch., *Eur. Schmett.* ii. 1. p. 91. n. 31 (1847) ; Walk., *List Lep. Ins. B. M.* viii. p. 243. n. 3 (1856) ; Assm., *Zeitschr. Ent. Bresl.* i. p. 5 (1857) ; Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.) ; Grebn., *Tijdschr. Ent.* v. p. 19 (1862) ; Wall., *Skand. Het. Fjär.* p. 12. n. 1 (1863) ; Ball., Bull. Mosc. p. 365 (1864) (Gorki) ; Grebn., *l.c.* vii. p. 25 (1864) ; Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Snell., *Vlind. Nederld.* p. 102 (1867) (v.-vii.) ; Barnes, *Entom.* iii. p. 364 (1867) (larva, var.) ; Gav., *Tijdschr. Ent.* x. p. 197. n. 78 (1867) (Groningen) ; Tengstr., *Act. Soc. F. F. Fenn.* x. p. 6. 98 (1869) ; Rans., *Entom.* iv. p. 148 (1869) (ab.) ; Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 77 (1870) (Breda) ; Brutt., *Progr. Gymn. Dorpat* p. 24. n. 12 (1872) (v., vi.) ; Cliff., *Entom.* vi. p. 288 (1873) (var. of larva) ; Siebke, *Enum. Ins. Norv.* iii. p. 25. n. 3 (1874) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 23. n. 10 (1875) ; Flem., *Entom.* xiii. p. 243 (1880) (larva, var.) ; Weil., *Progr. Oberrealsch. Innsbr.* p. 15 (1880) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 45 (1880) ; Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 236. t. 6. f. 55. 56. 57 (1882) (larva) ; Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5 p. 127. n. 160 (1882) ; Albr., *Bull. Moscou* p. 379 (1882) (Moscoa) ; Lampa, *Ent. Tidskr.* vi. p. 27. n. 121 (1885) ; Kronl., *Bull. Soc. Oural.* xi. p. 214. n. 91 (1885) (Sarapoul, v.) ; Haar, *Tijdschr. Ent.* xxix. p. 30 (1886) (Alblasserwaard) ; Amel., *Berl. Ent. Zeitschr.* xxxi. p. 262 (1887) (Dessau) ; Mina-Pal. & Failla-Ted., *Nat. Sic.* vii. p. 42 (1889) ; Gould, *Trans. Ent. Soc. Lond.* p. 241. t. 11. f. 11-13 (1892) (larva). Hofm., *Raup. Grossschm.* p. 30. t. 8. f. 7. a. b. c (1793) ; id., *Grossschm.* p. 31. n. 4. t. 18. f. 6 (1894) ; Barrett, *Lep. Brit. Is.* ii. p. 7. n. 2. t. 42. f. 1. a—d (1895) ; Kill. & Catl., *Jahrb. Nat. Ges. Graub.* xxxviii. App. p. 20 (1895) ; Vos, *Tijdschr. Ent.* xli. p. 80 (1898) (Apeldoorn) ; Bartel, in Rühl, *Grossschm.* ii. p. 183 (1900) ("Transcauc., Kuku-Nor" alia subsp.) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. n. 725 (1901) (partim).

Laothoë populi, Fabricius, in Illig., *Mag. Ent.* vi. p. 287. sub n. 42 (1807) ; Mann, *Wien. Ent. Monatsschr.* iii. p. 92 (1859) (Sicily) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 589. n. 1 (1877).

Dilina populi, Dalman, *Kongl. Vet. Ak. Handl.* xxxvii. p. 212 (1816) ; Zett., *Ins. Lep.* p. 917 (1840).

Polyptychus populi, Hübner, *Verz. bek. Schm.* p. 141. n. 1517 (1822).

Smerynthus (!) *populi*, Cantener, in Silberm., *Rev. d'Ent.* i. p.77 (1833) (Dép. du Var, v., viii.).
Smerinthus tremulae, Glaser, *Ber. Oberh. Ges. Nat. Heilk.* p. 83 (1853).
Amorpha populi, Kirby, *Cat. Lep. Het.* i. p. 710. n. 2 (1892) (Europe; "N. & W. Asia" alia subsp.).
Smerinthus populi ab. *rufescens* Selys-L., *Ann. Soc. Ent. Belg.* i. p. 42 (1857); Fuchs, *Jahrb. Nass. Ver. Nat.* xliii. p. 204 (1889); Bartel, *l.c.* p. 193 (1900).
Smerinthus populi var. *reseotincta* Reuter, *Act. Soc. F. F. Fenn.* ix. 6. p. 20. n. 97 (1893).
Smerinthus populi ab. *fuchsi* Bartel, *l.c.* p. 193 (1900) (Centr. Europe).
Smerinthus populi ab. *borkhauseni* id., *l.c.* p. 194 (1900) (Hessen; Roumania; Belgium).
Smerinthus populi Linn. ab. *tremulae* Borkh. (1793), Gillmer, *Ins. Börse* xix. p. 228 (1902).
Amorpha populi ab. *suffusa* Tutt, *Brit. Lep.* iii. p. 469 (1902).
Amorpha populi ab. *pallida* id., *l.c.*

♂♀. Very variable in the ground-colour. By breeding in and in many individuals are produced with a reddish tint and scarcely a trace of the lines on the forewing.—For gynandromorphous specimens, which are not rare in this subspecies, see Bartel, *l.c.* p. 185 (1900). For hybrids compare *Sphinx ocellata*.

Sexual organs: Pl. XXXIV. f. 24; Pl. XXIX. f. 40.

Larva on *Populus* and *Salix*.

Two broods; the second irregular, generally only obtained in confinement. Wings of the second brood mostly less obviously scalloped.

Hab. Western Palaearctic region as far east and south as S. Russia, Greece, Sicily, and Spain; Syria.

Staud. & Reb., *l.c.*, state that *populi* does not occur in Greece. There are, however, Grecian specimens in the British Museum collected by Mr. Merlin, late manager of the Ionian Bank.

In the Tring Museum a series of larvae and pupae, and 150 odd specimens.

A specimen from Akbès, Syria, in coll. Chas. Oberthür stands intermediate between *pop. populi* and *pop. populeti*; a similar specimen in the Tring Museum from the neighbourhood of Marash (M. Martinez de la Escalera).

c. A. populi populeti.

Smerinthus populeti Bienert, *Lep. Erg. Reise Persien* p. 33 (1869) (Meschhet, Chorlog, vii.;—Mus. St. Petropolis?); Staud., *Cat. Lep. Eur.* ed. ii. p. 423. n. 488 bis (1871): Christ., *Stett. Ent. Zeit.* xxxiii. p. 216 (1872); id., *Hor. Soc. Ent. Ross.* x. p. 31 (1873) (Schahrud); Bartel, in Rühl, *Grossschm.* ii. p. 194 (1900) (N. Persia; Turkestan; Kuldscha).
Smerinthus populi, Leder, *Ann. Soc. Ent. Belg.* xiii. p. 28 (1870) (Caucasus); Staud., *Cat. Lep. Eur.* ed. ii. p. 37. n. 488 (1871) (partim); Rom., *Mém. Lép.* i. p. 72 (1884) (Urmus; Lagodekhi; Helenendorf; vi., vii.); Hamps., *Journ. Linn. Soc. Lond.* xxvii. p. 412 (1899) (Lake Urmi, N. W. Persia).
Smerinthus populi var. *populeti*, Erschoff, *Reise Fedtschenko* p..26. n. 32 (1874) (Kuldscha); Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. sub n. 725 (1901).
**Smerinthus populi* var. *populetorum* Staudinger, *Stett. Ent. Zeit* xlviii. p. 65 (1887) (Usgent; Osh;—coll. Staudinger); Gr.-Grschim., in Rom., *Mém. Lép.* iv. p. 513. n. 208 (1890) (Osch, E. iv.); Bartel, *l.c.* p. 195 (1900) (Turkestan); Staud. & Reb., *l.c.* p. 99. sub n. 725 (1901).
Amorpha populi var. *b. Smer. p.*, var. *populetorum*, Kirby, *l.c.* sub n. 2 (1892).
Amorpha populeti, Kirby, *l.c.* p. 710. n. 4 (1892) (Persia).
Amorpha populi var. *populeti*, Tutt, *Brit. Lep.* iii. p. 472 (1902).
Amorpha populi var. *populetorum*, id., *l.c.*

♂♀. A large pale Asiatic race of *A. populi*. It has the distal margins of the wings less scalloped than the western form; the tenth tergite of the ♂ is obviously broader, the sternite longer, the lobes of the harpe slenderer and longer, especially the upper one, and the penis-sheath has fewer spines. A specimen from Saratow, S. Russia, from the collection of Grum-Grschimaïlo, agrees in the colour and outline of the wings with Ferghana examples; it is rather small (length of forewing

38 mm.) and approaches in the structure of the genital apparatus a little the western *populi*.

Hab. North Persia to the Caucasus and the Altai Region.

In the Tring Museum 2 ♂♂, 4 ♀♀ from : Turkestan ; Ferghana.

278. Amorpha amurensis.

Sphinx tremulae, Boisduval (*non* Borkhausen, 1793), *Ind. Meth.* p. 34 (1829) (Russ. mer.) ; Fisch., *Oryct. Mosc.* t. 10. f. 1. 2 (1830) (Moscow).

Smerinthus tremulae, Treitschke, *Schm. Eur.* x. i. p. 140 (1834) (descr. of larva erron.).

**Smerinthus tremulae* var. *amurensis* Staudinger, in Rom., *Mém. Lép.* vi. p. 232. n. 220 (1892) (Amur ;—coll. Staudinger).

♂ ♀. Structurally very close to *populi*. Ground-colour variable as in that species. The rufous patch of the hindwing absent or barely indicated. Harpe much broader than in *populi*, the two lobes being very broad ; the sheath of the penis multispinose almost all round the edge, the spines small on one side of the sheath ; tenth tergite shorter than in *populi*, sternite more evenly convex below, its sides straighter, the apex more obtuse. Vaginal plate as in *populi*, the ridge in front of the vaginal cavity shallowly emarginate.

Larva described and figured by Fisher, *l.c.*—Food-plants : *Populus tremula* and *lancifolia*.

Treitschke describes the larva as not chagreened, being sometimes quite glossy as if varnished ; he further states that there are no side-bands, or only traces of them, that the head is more rounded than triangular, and that the horn is long and occasionally carmine-red. This description, which Duponchel doubts as being correct and which Boisduval calls absurd, has been copied over and over again by the writers on Palaearctic Lepidoptera.

Hab. Russia eastwards to Wladiwostock and Mupin.

Two subspecies :

a. A. amurensis amurensis.

Sphinx tremulae, Boisduval, *l.c.* ; Fischer, *l.c.*

Smerinthus tremulae, Treitschke, *l.c.* ; Duponch., in God., *Lép. France, Suppl.* ii. p 29. t. 2. f. 2. a. b. (1835) ; Herr.-Sch., *Schm. Eur.* ii. p. 91. *Sph.* t. 4. f. 12 (1847) ; Mén., *Enum. Corp. Anim. Petrop., Lep.* ii. p. 138. n. 1567 (1857) (St. Petersb.) ; id., *Schrenk's Reis.* ii. *Lep.* p. 48. n. 111 (1859) (Amur) ; Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.) ; id., *l.c.* p. 55 (1863) (St. Petersb., if occurring ?) ; Tengstr., *Act. Soc. F. F. Fenn.* x. p. 7. n. 99 (1869) ; Staud., *Cat. Lep. Eur.* ed. ii. p. 38. n. 489 (1871) (Russia centr. et sept.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 24. n. 11 (1875) (descr. of larva by Treitschke absurd !) ; Alfbr., *Bull. Moscou* p. 379 (1882) (Muscow) ; Lampa, *Ent. Tidskr.* vi. p. 27 (1885) (Finland) ; Oberth., *Bull. Soc. Ent. France* p. 56 (1886) (Manchuria, viii.); Graes., *Berl. Ent. Zeitschr.* xxxii. p. 106. n. 191 (1888) ; Hofm., *Raup. Grossschm.* p. 30. t. 6. f. 19 (1893) ; id., *Grossschm. Eur.* p. 31. n. 5 (1894) ; Bartel, in Rühl, *Grossschm.* ii. p. 199 (1900) (descr. of larva error.) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. n. 724 (1901).

Smerinthus populi ?, Walker, *List Lep. Ins. B. M.* viii. p. 244. sub n. 3 (1856).

Amorpha tremulae, Kirby, *Cat. Lep. Het.* i. p. 710. n. 3 (1892) Russia).

Smerinthus tremulae var. *amurensis* Staudinger, in Rom., *Mém. Lép.* vi. p. 232. n. 220 (1892) (Amur ; —coll. Staudinger) ; Bartel, in Rühl, *Grossschm.* ii. p. 201 (1900) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. sub n. 724 (1901) (Amur ; Ussuri).

Smerinthus tremulae var. *amurensis* ab. *rosacea* Staudinger, in Rom., *Mém. Lép.* vi. p. 232. sub n. 220 (1882) (Amur ;—coll. Staudinger) ; Bartel, *l c.*

♂ ♀. We cannot find any fairly constant difference between the specimens from Russia and the Amur. *Bred* Amur individuals are on the whole more glossy grey

than *caught* examples from Europe. Some of the bred individuals from both countries are grey-ochraceous; these specimens are found most likely more often among the few which emerge from the chrysalis in the same year, or they may be produced by breeding in. The ♀ figured by Duponchel belongs to this ochraceous form. The Russian entomologists should be able to furnish science with the life-history of this insect, which is very insufficiently known.

Hab. Finland, Russia as far north as the Govv. Archangel, eastwards to Wladiwostock.

In the Tring Museum 11 ♂♂, 5 ♀♀ from Russia and Amurland.

All authors quote Herr. Schäff. f. 14. In our copy and that of the Brit. Mus. there are only thirteen figures of Sphingidae, and f. 12 is *amurensis*.

b. A. amurensis sinica subsp. nov.

♂. Ground-colour darker than in all the specimens of the previous subspecies which we have seen; wings broader, especially the hindwing, which is less produced at SC^2 and R^1, less sinuate before and behind this lobe, much more evenly rounded from this lobe to the anal angle than in the preceding subspecies; veins and costal edge of forewing not obviously paler, the pale grey, somewhat purplish, scaling of both wings more restricted above and below. Harpe with the lower lobe narrowed to end, almost pointed; tenth sternite longer than in *amur. amurensis*.

♀. Not known.

Hab. China.

Three ♂♂ in coll. Chas. Oberthür from: Pou-lin (*type*); Ta-tsien-lu; Mupin. Mons. Oberthür kindly presented the Mupin specimen to the Tring Museum.

LXXXIV. PHYLLOSPHINGIA.—Typus: *dissimilis*.

Triptogon Bremer, *Bull. Ac. St. Pétersb.* iii. p. 475 (1861) (nom. indescr.).
Smerinthus, id. (*non* Latreille, 1802), *Lep. Ost-Sib.* p. 35 (1864).
Maruuba, Kirby (*non* Moore, 1882), *Cat. Lep. Het.* i. p. 707 (1892).
Phyllosphingia Swinhoe, *Ann. Mag. N. H.* (6). xix. p. 164 (1897) (type: *dissimilis*).
Polyptychus, Leech (*non* Hübner, 1822), *Trans. Ent. Soc. Lond.* p. 277 (1898).
Clarkia Tutt, *Brit. Lep.* iii. p. 386 (1902) (type: *dissimilis*).

♂♀. Tongue weak, reaching scarcely to end of forecoxa, the two halves separate, but with fringe. Pilifer with bristles. Palpus of ♂ prominent, smaller in ♀, second segment not rough-scaled, joint not open. Antenna setiform, side-line almost even in dorsal view in ♂; feebly constricted at the joints in ♀, without distinct seriated ciliae (♀). Abdomen with large underscales, upperscales long, woolly, no spines, except at edges, but these spines very weak, scale-like. Tibiae *spinose*; hindtibia with *two* pairs of spurs, longer terminal one more than half the length of the first tarsal segment; pulvillus present; paronychium with *one* lobe at each side, the ventral lobes being vestigial. Distal margin of wings dentate, costal margin of hindwing concave in basal half, then convex, apex of wing rounded; frenulum *vestigial*, no retinaculum. Clasper and eighth tergite without friction-scales.

Larva green, shagreened, with pale oblique side-stripes, which are occasionally bordered with red in front.—Food-plant: *Juglans mandschurica*.

Chrysalis strongly shagreened; middle abdominal sternites posteriorly with short pointed tubercles, which serve as an organ of locomotion. (See Appendix.)

Hab. Japan : Amurland to Assam.

One species.

Bremer expressly states that he places the species only provisionally in Ménétriés's (nondescript) genus *Triptogon* ; therefore it cannot be considered the type of *Triptogon* (see *Marumba*).

279. Phyllosphingia dissimilis.

Triptogon dissimilis Bremer, *Bull. Ac. St. Pétersb.* iii. p. 475. n. 26 (1861) (Ussuri ;—Mus. St. Petropolis).

♂. Tenth abdominal tergite narrowed to a point (Pl. XXII. f. 12), slender ; sternite triangular, longer than in *Mimas tiliae*. Clasper (Pl. XXXII. f. 14) large, triangular, with a basal mesial fold which bears heavy stiff bristles ; harpe armed with spines at the edge. Penis-sheath with a longitudinal fold at end on each side, therefore appearing dilated in a ventral or dorsal view (Pl. XXIX. f. 36).

♀. Vaginal plate (Pl. XIX. f. 3) with a broadly triangular lobe in front of the cavity ; the lobe as well as the sides of the postvaginal plate strongly folded. Eighth tergite see Pl. XIX. f. 4.

Larva and chrysalis see above.

Hab. Japan ; Amurland to Assam.

Two subspecies :

a. P. dissimilis dissimilis.

Triptogon dissimilis Bremer, *l.c.* ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 586. n. 5 (1877) (Ussuri).

Smerinthus dissimilis Bremer, *Lep. Ost-Sib.* p. 35. n. 154. t. 3. f. 12 (1864) ; Staud. & Wocke, *Cat. Lep.* ed. ii. p. 38. n. 490 (1871) ; Oberth., *Bull. Soc. Ent. Fr.* p. 55 (1886) (vi. vii., *l.* on *Juglans*) ; Leech, *Proc. Zool. Soc. Lond.* p. 586. n. 23 (1888) (Tokio ; Oiwake ; Kiukiang) ; Graes., *Berl. Ent. Zeitschr.* xxxii. p. 106. n. 193 (1888) (*l.* and *p.* sound produc.) ; Leech, *Trans. Ent. Soc. Lond.* p. 119. n. 92 (1889) (Kiukiang) ; Staud., in Rom., *Mém. Lép.* vi. p. 231. n. 219. t. 4. f. 3 (pupa) (1892) ; Bartel, in Rühl, *Grossschm.* ii. p. 152 (1900) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 99. n. 723 (1901) (Uss. ; Jap.).

Marumba dissimilis, Kirby, *Cat. Lep. Het.* i. p. 707. n. 20 (1892).

Polyptychus dissimilis, Leech, *Trans. Ent. Soc. Lond.* p. 277. n. 37 (1898) (partim ; Oiwake ; Tokio ; Kiukiang).

The Kiukiang specimen mentioned by Leech is "rosy-brown."

Hab. Amurland ; Kiukiang, China ; Japan.

In the Tring Museum 7 ♂♂, 7 ♀♀ from Amurland.

b. P. dissimilis perundulans.

**Phyllosphingia perundulans* Swinhoe, *Ann. Mag.* N. H. (6). xix. p. 164 (1897) (Jaintia Hills;—Mus. Brit.).

Phyllosphingia dissimilis, Hampson, *Journ. Bombay N. H. Soc.* xi. p. 280. n. 926. fig. (♂) (1898) (= *perundulans*).

Phillosphingia (!) *perundulans*, Leech, *Trans. Ent. Soc. Lond.* p. 277. n. 37 (1898) (sub syn. ; = *dissimilis*).

♂. Large, tawny. The dark discal patch of upperside of forewing concave between M^1 and M^2, postcellular portion a little less extended posticad than in *diss. dissimilis* ; the brown marginal area projecting obliquely to lower angle of cell. Sexual armature as in the northern race, but tenth sternite narrower proximally and stouter distally.

♀. Not known.

Hab. Jaintia Hills, Assam.

One ♂ (*type*) in the British Museum.

LXXXV. PACHYSPHINX gen. nov.—Typus: *modesta*.

Smerinthus, Harris (*non* Latreille, 1802), in Sillim., *Journ. Sci. Art* xxxvi. p. 292 (1836).
Laothoë, Grote (*non* Fabricius, 1807), *Bull. Buffalo Soc. N. Sci.* i. p. 24 (1874).
Amorpha, id., *l.c.* ii. p. 227 (1874) (*nom. nud.*).
Triptogon, Butler, *Trans. Zool. Soc. Lond.* ix. p. 589 (1877) (*nom. nud.*; partim).
Marumba, Kirby (*non* Moore, 1882), *Cat. Lep. Het.* i. p. 708 (1892).

♂♀. Very close to *Sphinx*, from which it differs, in the *larval* state, in the reduced horn, the slightly humped thoracical segments and less triangular head; in the *imago* state, in the bristles of the pilifer being mostly modified to hair-scales. The abdominal tergites are spinose all over, the spines as stout as in *Amorpha*, less weak than in *Sphinx*. Anterior tibia ending in a heavy thorn, homologous to that of *Sphinx ocellata*, *cerisyi*, and *kindermanni*. Frenulum vestigial in both sexes.

♂. Tenth abdominal sternite broader than in *Sphinx*. Clasper very broad, very obtuse, the end of the abdomen appearing truncate; harpe with two distal lobes corresponding to those of *Amorpha*, and an upper dentate ridge. Penis-sheath without external armature; a conical tooth upon the membrane of the duct inside the sheath. No retinaculum.

♀. Vaginal plate with a low thick ridge before the vaginal cavity, without lobes; the whole eighth segment strongly chitinised.

Larva granulose; head more triangular in the last and in the first stages than in the intermediate ones; horn very short, longer in the young larva; thoracic tergites transversely raised, the crest also more prominent in the younger caterpillar.—Food-plants: *Populus*; *Salix*.

Pupa similar to those of *Amorpha* and *Sphinx*.

Hab. Nearctic Region, from Canada to Mexico, westward to the Pacific.

Only one species, which is individually, seasonally, and geographically variable. Butler put this insect (in 1877) into a genus comprising the Old World species allied to *dyras*, and maintained that "this is unquestionably the proper place for this species." Grote accepted Butler's opinion as being well founded; and since then numerous writers have followed in the same wake. However, the affinity of *modesta* with *dyras* and allies is very distant. Apart from structure, which was not known to Butler and Grote, and most likely not to any of the authors who were misled by them, and therefore may be passed over, any casual observer who is acquainted with the various species of *Sphinx*, *Amorpha*, and Butler's *Triptogon* (called by Moore *Marumba*, and dealt with in this Revision under that name) can scarcely fail to notice the close agreement in colour and pattern between *Pachysphinx*, *Sphinx*, and *Amorpha*, and the conspicuous dissimilarity of *Marumba*, the species of which have all, on the forewing, the peculiarly curved, almost looped, discal lines.

Pachysphinx is to a certain extent a combination of *Amorpha* and *Sphinx*. The thorax is unicolorous (or practically so) as in *Amorpha*; the hindwing is red as in *Sphinx*, and has the same anal patch as *Sphinx kindermanni*; the forewing agrees decidedly better with that of *Amorpha*. There are on the forewing of *Amorpha*, in the middle area, five lines: two between the base of M^2 and the end of the cell, the more proximal line forming the border of the dark band, the second line being situated within the band and disappearing often; beyond the cell there are three more lines, the first obscure, often absent, the second more or less crenate

(the points directed basad) and forming the outer border of the dark band or band-like area, the third line also crenate, more distal. In *Pachysphinx* we meet with the same lines, the second (within the dark band) being, however, always absent and the third seldom obvious ; the fourth and fifth are crenate as in *Amorpha*. In *Sphinx* the homology of the lines is obscured. The hindwing of *Pachysphinx*, though so similar to that of *Sphinx kindermanni*, reminds one nevertheless of *Amorpha populi* by the red colour being intensified subbasally behind the cell, forming here a patch corresponding to the tawny patch of *populi*. The red basal area on the forewing below is a *Sphinx* character. In structure *Pachysphinx* agrees with some species of *Sphinx* in possessing a claw at the end of the foretibia, and with *Amorpha* in the more strongly spinose abdominal tergite and the bilobate harpe. The penis-sheath is similar to that of *Amorpha* in being devoid of a conical tooth, while it differs from both *Amorpha* and *Sphinx* in being very slender, and having instead of a number of spines a single tooth as armature of the membrane of the duct. The frenulum of the ♂ is as much reduced as in *Sphinx*.

280. Pachysphinx modesta.

Smerinthus modesta Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 292. n. 6 (1839).
Smerinthus modestus (!), Walker, *List Lep. Ins. B. M.* viii. p. 248. n. 10 (1856).
**Smerinthus princeps* id., *l.c.* p. 225. n. 21 (1856) (Mus. Brit.).
Laothoë modestus, Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 24 (1874).
Smerinthus populicola Boisduval, *Spec. Gén. Lép. Het.* i. p. 22. n. 9 (1875) (*nom. nov.*).
Amorpha modesta, Grote, *l.c.* ii. p. 227. n. 44 (1875).
Triptogon modesta, Butler, *Trans. Zool. Soc. Lond.* ix. p. 589. n. 23 (1877) ; Grote, *l.c.* iii. p. 223. n. 45 (1877).
Smerinthus occidentalis var. Edwards, *Calif. Ac. Nat. Sci.* vi. p. 92 (1876).
Smerinthus cablei Reizenstein, in *Scribner's Monthly* xxii. p. 864. fig. (1881).
Marumba modesta, Kirby, *Cat. Lep. Het.* i. p. 708. n. 33 (1892).

♂. Antenna long, strongly compressed, slightly dilated laterad as in *Sphinx ocellata*, ciliae long. Tenth abdominal tergite stronger chitinised than in *Sphinx* ; the sternite much broader than in *Sphinx* and *Amorpha*, with almost parallel sides (Pl. XXII. f. 13). Clasper dilated dorsad at apex, very broad (Pl. XXII. f. 13) ; harpe large, ventro-distally produced into two lobes ; the dorsal edge of the harpe raised into a broad lobe, which is rough with short pointed tubercles and teeth. Penis-funnel short, without process ; penis-sheath comparatively slender and weak (absolutely slenderer than in the much smaller species of *Sphinx*), without external armature ; the membrane of the duct strongly chitinised in a small place, armed with a more or less prominent solid tooth, which is visible through the sheath as a black spot, if the duct is not pushed out (Pl. XXIX. f. 37).

♀. Antenna thin ; proximal edges of the segments feebly raised, dorso-lateral expansions of ♂ barely vestigial in ♀ ; a proximal series of very slightly prolonged ciliae, surface of segments feebly concave laterally and ventrally. Eighth abdominal segment rather strongly chitinised, brown ; antevaginal portion of plate short (Pl. XV. f. 17), the ridge thick.

Hab. Nearctic Region.

There are three subspecies :

P. modesta { *modesta* : Eastern States ; Canada to California ;
imperator : Arizona ;
regalis : Mexico.

Judging from our Arizona material obtained from Dr. E. Kunze and E. J.

Oslar, we believe that a paled form can be reared by in-breeding, as in the case of *Amorpha populi* and *amurensis*. The specimens of the second brood, resp. the individuals which emerge from the chrysalis the same summer, will also turn out to be partly paler than the specimens from hibernated pupae.

a. P. modesta modesta.

Smerinthus modesta Harris, *l.c.* (1839) ; Agass., *Lake Superior* p. 338. t. 7. f. 7 (1850) ; Clem., *Journ. Ac. Nat. Sci. Philad.* iv. p. 183. n. 86 (1859) (Mass. ; L. Sup. ; Penn. ; N.Y.) ; id., in Morris, *Syn. Lep. N. Am.* p. 210. n. 3 (1862) ; Bowl., *Canad. Ent.* iii. p. 143 (1871) (Quebec) ; Streck., *Lep. Rhop. Het.* p. 52. 60. t. 7. f. 11 (♂) (1873) (Canada to Middle States) ; Pears., *Canad. Ent.* vii. p. 80 (1875) (Montreal) ; Bunk., *Canad. Ent.* ix. p. 210 (1877) (transf.) ; Worth., *Canad. Ent.* x. p. 16 (1878) (Chicago) ; Coq., *Trans. Dept. Agr. Illin.* xviii. App. p. 159 (1880) ; Kell., *Bull. Buffalo Soc. N. Sci.* iv. p. 29 (1881) (larva, pupa) ; Reed, *Rept. Ent. Soc. Ont.* xii. p. 63 (1882) (larva).

Smerinthus modestus (!), Walker, *List Lep. Ins. B. M.* viii. p. 248. n. 10 (1856) ; Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 181 (1859) ; Morris, *Cat. Lep. N. Am.* p. 20 (1860) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 161. 185. n. 73 (1865) (Atlantic distr.) ; Saund., *Canad. Ent.* iv. p. 36 (1872) (London, Can.) ; Caulf., *Canad. Ent.* vii. p. 80. n. 9 (1875) (Montreal, rare) ; Andr., *Psyche* ii. p. 72 (1877) (larva) ; Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O.) ; Pack., *Ins. Inj. Forest Trees* p. 450. n. 19 (1890).

**Smerinthus princeps* Walker, *List Lep. Ins. B. M.* viii. p. 255. n. 21 (1856) (Mus. Brit.) ; Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 75 (1868) (= *modesta*).

Laothoë modestus (!), Grote. *Bull. Buffalo Soc. N. Sci.* i. p. 24 (1873).

Laothoe modesta, Thaxter, *Psyche* i. p. 29 (1874) (Newton, Mass.).

Smerinthus populicola Boisduval, *Spec. Gén. Lép. Hét.* i. p. 22. n. 9 (1875) (nom. nov. loco *modesta* ; Canada ; Calif.) ; Edw., *Ent. Amer.* iii. p. 223 (1887).

Amorpha modesta, Grote, *Bull. Buffalo Soc. N. Sci.* ii. p. 227. n. 44 (1875) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 312. t. 7. f. 7 (1895) (N. Y. ; E. vii. viii.).

Triptogon modesta, Butler, *Trans. Zool. Soc. Lond.* ix. p. 589. n. 23 (1877) ; Grote, *Bull. Buffalo Soc. N. Sci.* iii. p. 223. n. 45 (1877) (Can. ; Mass. ; N. Y.) ; id., *Canad. Ent.* ix. p. 131 (1877) ; Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine, rare, vii.) ; id., *Sphing. New Engld.* p. 71. n. 34 (1886) ; Grote, *Canad. Ent.* xviii. p. 134. n. 53 (1886) (Can. southward) ; id., *Hawk Moths N. Am.* p. 37 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 216. t. xi. f. 3. 4. 5 (genit. ; ant.) (1888) (Canada to Louis., westw. to Calif.) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 44 (1889) (lit. ref. to metam.) ; Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N. Y., electr. light) ; Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (1 ♀ Calif. ex coll. Hy. Edw.) ; Trum., *Ent. News* viii. p. 27 (1897) (S. Dakota) ; Rowl., *Ent. News* ix. p. 190 (1898) (Missouri ; not uncommon) ; Soule, *Psyche* viii. p. 308 (1899) (larva).

Smerinthus occidentalis var. Edwards, *Proc. Calif. Ac. N. Sci.* vi. p. 92 (1876) (Calif. ; Nevada ; Oregon ; *non* " Arizona ").

Triptogon modesta var. *occidentalis*, Grote, *Bull. Buffalo Soc. N. Sci.* iii. p. 223. sub n. 45 (1877) (California) ; id., *Hawk Moths N. Am.* p. 37 (1886) ; Hanh., *Canad. Ent.* xxxi. p. 50 (1899) (Manitoba).

Triptogon occidentalis, Holland, *Canad. Ent.* xviii. p. 105 (1886) (west. var. of *mod.*) ; Grote, *Canad. Ent.* xviii. p. 134. n. 54 (1886) (Calif., etc.) ; Heath, *Canad. Ent.* xxxii. p. 94 (1900) (Manitoba, vii., after midnight).

Smerinthus cahlei Reizenstein, in *Scribner's Monthly* xxii. p. 864. fig. (1881) (Louisiana) ; Pearce, *Encycl. Amer.* i. p. 689 (1884) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 218 (1888) (= *modesta*).

Marumba modesta, Kirby, *Cat. Lep. Het.* i. p. 708. n. 33 (1892) (N. Am.)

Marumba cahlei, id., *l.c.* n. 35 (1892).

♂ ♀. Our Californian specimens, from Los Angeles, May, six in number, do not differ from the eastern ones except in some of them having a faint red longitudinal patch behind the cell near the base on the underside of the hindwing ; in eastern examples the posterior part of the antemedian brown band of the same wing is often red, but the before-mentioned red mark is not present in any of our examples from the Eastern States. In ground-colour those Californian individuals are exactly

like ordinary *modesta modesta*. According to Hy. Edwards, *l.c.*, the Californian specimens of *modesta* are much paler in ground-colour, differing markedly from the eastern form. He unites with them Arizona specimens, which are indeed conspicuously different from Atlantic examples. It is possible that Edwards had, besides Arizona specimens, only individuals of a second brood from California, which we presume are all or partly paler than those from hibernated pupae. If that was the case the name *P. modesta modesta* f. t. *occidentalis* may be employed for them, and f. t. *modesta* for the ordinary dark form.

The amount of red on the hindwing is variable. There is generally a pale distal border as in *Sphinx jamaicensis*. Sometimes the black bar or spot before the anal angle becomes more or less red anteriorly. Size variable. Apical lobes of harpe about equal in length, obtusely rounded. Tenth sternite truncate or emarginate. Tooth of duct of penis large.

Hab. Canada to Louisiana, westwards to California, Oregon, and British Columbia.

In the Tring Museum some larvae and pupae, 30 ♂♂, 16 ♀♀ from : N. Jersey ; Iowa ; Ohio ; South Dakota ; British Columbia ; South California.

b. P. modesta imperator.

Smerinthus occidentalis var. Edwards, *Proc. Calif. Ac. Nat. Sci.* vi. p. 92 (1876) (partim ; Ft. Yuma, Arizona).

Smerinthus imperator Strecker, *Lep. Rhop. Het.* p. 125. t. 14. f. 3 (♀) (1878) (Arizona) ; Edw., *Ent. Amer.* iii. p. 223 (1887).

Triptogon imperator, Smith, *Trans. Amer. Ent. Soc.* xv. p. 217 (1888) (Arizona).

Edwards's *occidentalis* includes the present subspecies. As Edwards speaks in his description of "our examples" of *modesta*, we accept the Californian *modesta* as being the true *occidentalis* and retain the name *imperator* for the Arizona form. The examples from Colorado which we have, mostly collected by Mr. Oslar, come very near *imperator*, approaching somewhat the palest individuals of *mod. modesta* ; one of them, however, labelled Durango, 12. vi. '99, is darker than any individual of *modesta* which has come under our notice, the olive median band of the forewing being very pronounced and the red colour of the hindwing not only being restricted, but also much obscured. The Colorado *modesta*, therefore, are neither true *mod. modesta*, nor true *mod. imperator*, but form a connecting link.

♂♀. Large, rough-scaled. Stigma of forewing large, discal lines strongly crenate ; pale abdominal and anal area of hindwing more extended than in *mod. modesta* ; the proximal black anal bar narrow and long. Lobes of harpe unequal, the upper one generally much shorter (Pl. XXXIV. f. 31) ; tooth of penis-sheath much smaller than in *mod. modesta* ; both the tenth tergite and sternite narrower, the latter more obviously rounded at end (Pl. XXII. f. 13).

There are two broods in Arizona, which we name :

a'. P. modesta imperator f. t. *imperator.*

♂♀. The spring-brood. Forewing greyish white at the proximal side of the median band and between the two crenate discal lines ; the band more or less shaded with grey or buff, but the proximal border-line always conspicuous. ♂ darker than ♀.

Received from Dr. E. Kunze, labelled as follows : Phoenix, Arizona, 6. iv. '97

(♂), 9. iv. '97 (♂♂), 12. iv. '97 (♂), 15. iv. '97 (♂), 16. iv. '97 (♂♀), 6. v. '97 (♀), 7. v. '97 (♀), 24. v. '97 (♂, transition to the following).

Our 11 Colorado specimens agree more or less with this form, except the one mentioned above.

b'. P. modesta imperator f. t. *kunzei* form. nov.

♂♀. The summer form. Very pale. Upperside.——Forewing creamy buff, basal area and interspace between discal and postdiscal lines whitish cream-colour, lines all vestigial or absent.——Hindwing: anal area cream-colour, the two blackish brown anal bars of the spring form vestigial and cream-colour like the distal margin.——Underside without lines.

Received from Dr. E. Kunze, in whose honour we name this peculiar form, labelled: Phoenix, Arizona, 8. vii. '97 (♂, *type*), 14. vi. '97 (♀), 3. ix. '97 (♀).

Hab. Arizona (typical) and Colorado; Sonora?; Lower California.

A pair from Lower California in the Paris Museum agrees on the whole with f. t. *imperator*, but has the discal band and the apical area of the forewing more strongly washed with tawny ochraceous. Besides, the stigma is smaller and yellowish, the proximal border-line of the band is not black, and is less angulate than in true *imperator*, and the hindwing is more suffused with black at the anal angle than in those Arizona specimens which have the forewing washed with ochraceous. The pair represents perhaps a separate subspecies; but more material should be examined before a name is proposed.

c. P. modesta regalis subsp. nov.

Smerinthus modesta, Clemens, *Journ. Ac. N. Sci. Philad.* iv. p. 183. n. 86 (1859) (partim; Mexico).
Triptogon modesta var. *occidentalis*, Druce (*non* Edwards, 1876), *Biol. Centr. Amer., Lep. Het. Suppl.* p. 310. n. 1. t. 67. f. 2 (♀) (1896) (Durango).

♂♀. As large as *imperator*. Forewing above more uniform in colour than in the other two subspecies, more sombre-coloured, with a slight reddish tint, basal area not so pale as in f. t. *imp.* and *mod.*; discal lines crenate; distal margin less strongly scalloped, the upper teeth especially smaller than in *imperator*; marginal area not conspicuously marked with grey.——Hindwing: the red colour as much extended distad as in *imperator*, the anal area much shaded with black.

♂. Tenth abdominal tergite much more narrowed distally than in *imperator*; sides of lobe of sternite more slanting apicad, apex truncate with the angles strongly rounded. Ventro-distal part of harpe more produced ventrad, the two processes slender, closer together than in the other two subspecies, nearly equal in length. ♂ darker than ♀.

Hab. Jalisco and Durango, Mexico.

In the Tring Museum 2 ♂♂, 2 ♀♀ from Jalisco.

LXXXVI. MONARDA.—Typus: *oryx*.

Monarda Druce, *Biol. Centr. Amer., Lep. Het. Suppl.* p. 317 (1896) (type: *oryx*).

♂. Tongue short, not visible if rolled in. Pilifer with long bristles; genal process very obtuse; from beneath it protrude the hair-scales of the maxillary palpus. Palpus not projecting, rough-haired like the body and postero-basal areas of the wings. Antenna nearly two-thirds the length of the forewing, of the

same type as in *Cressonia*, segments somewhat dilated dorso-laterally, bipectinate ventrally at each side, the pectinations long, compressed; end-segment short. Spinules at the edges of the abdominal segments thin, narrow, long, very weak. Tibiae *not* spinose; spurs unequal, two pairs to hindtibia, longer apical spur about half the length of the first hindtarsal segment, which is not longer than segments 2 and 3 together; foretarsus short, segments almost equal in length except fourth, which is shorter, first with two long, stout, curved spines, one basal, the other apical; pulvillus and paronychium *absent*. Distal margins of wings convex, posterior angles rounded, not produced; frenulum and retinaculum present. Clasper without friction-scales.

♀ and early stages not known.

Hab. Jalisco, Mexico.

One species.

281. **Monarda oryx.**

**Monarda oryx* Druce, *l.c.* n. 1. t. 58. f. 6 (1896) (Jalisco;—coll. Schaus).

♂. The upper scales and most of the hairs of the forewing are deep ferruginous, except at costal and distal margins and upon veins, which are olive; two interrupted antemedian bands, and two discal series of lunules followed by a series of postdiscal spots, are black. There are no ferruginous scales on the underside of the wing, but some of the thoracical hair-scales and those at the lower edges of the abdominal tergites and on the legs are also more or less of the same peculiar colour. Our specimen has the antenna less pale, the forewing, thorax, and legs more ferruginous, the posterior angles of both wings better indicated, the distal margin of the hindwing less convex, and the blackish olive band of the same wing more straight than one of Mr. Schaus's specimens.

Tenth tergite (Pl. XXII. f. 16) slender, lanceolate, pointed, slightly curved downwards, extreme end more so, mesially carinate below; sternite also long, broader than the tergite, gradually narrowed, sinuate, the angles acute and curved upwards. Clasper large, sole-shaped; harpe irregular, ending in an obliquely sinuate process, sharply pointed; at the dorsal side of the sinus there is a small tooth, between which and a more proximal, large, triangular tooth there is another sinus. Penis-sheath with a long pointed process which curves proximad and laterad; penis-funnel simple.

Hab. Jalisco, Mexico.

Two ♂♂ in coll. W. Schaus and 1 ♂ in the Tring Museum from Guadalajara.

LXXXVII. CRESSONIA.—Typus: *juglandis*.

Sphinx, Abbot & Smith (*non* Linné, 1758), *Lep. Georgia* i. p. 57 (1797).
Smerinthus, Lepelletier & Serville (*nom* Latreille, 1802), *Enc. Méth.* x. p. 441 (1825).
Cressonia Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 186 (1865) (type: *juglandis*).

♂♀. Tongue slender, short. Palpi of ♂ long, very strongly diverging, second segment prolonged, strongly compressed, curved sidewards, gradually narrowed to end, third conical; very much smaller in ♀, slightly divergent, pointed as in ♂. Abdomen *without* spinules. Tibiae *spinose*; two pairs of spurs to hindtibia; pulvillus and paronychium present, the latter with *one* lobe at each side. Distal margins of wings undulate; costal margin of hindwing straight from base to

beyond middle, then somewhat projecting frontad, forming a rounded lobe; R^2 of hindwing before centre of cell, D^2 somewhat curved, D^1 not or little shorter than D^3; frenulum *vestigial*, retinaculum *absent*. Antenna peculiar; ♀: segments all longer than high, especially the distal ones, each thickest basally, the sides slightly rounded basally in dorsal view, and feebly sinuate apically; broader than high, and also than long excepting distal segments, depressed, somewhat prismatical, the ciliated surface feebly concave in middle, no distinct groove, no indication of pectinations, ciliae short, fasciculated ciliae barely indicated; ♂: segments much more obviously truncate pear-shaped in dorsal view (Pl. LXI. f. 3. 4. 5) than in ♀, strongly compressed ventrally, sides deeply grooved, the groove bordered above by a kind of carina, which projects a little over the groove, this carina not scaled; it is homologous to the lateral expansion of other Sphingid antennae; the compressed ventral parts of the segments separate (Pl. LXI. f. 3, lateral view); each segment produced subventrally on each side into an *apical* and a longer *basal* process which project laterad, the processes compressed, the longer diameter of the transsection vertical; the fascicles of long ciliae along the edges of the processes, forming on each segment, with the other fascicles, an apical and a basal row, which rows join each other above, the arrangement of the fascicles, therefore, the same as in other *Sphingidae*. The processes being expansions of the ciliae-bearing area are as a matter of course not scaled; they are not homologous with the branches of other pectinated Sphingid antennae, excepting those of *Monarda*, agreeing best with those of *Saturniidae*, as pointed out by Smith. The segments are slightly asymmetrical (Pl. LXI. f. 5). The antenna differs, however, essentially from that of the Saturniids and Ceratocampids in being scaled above, in possessing deep side-grooves, in the ventral part being strongly compressed, and in the single sensory cone being conspicuous and remaining in its place close to the end of the segment.

Larva pale green or reddish, with oblique side-stripes, which are bordered with red in front or are preceded by red subdorsal spots, these red spots resp. borders sometimes absent, anal segment mostly with a dark mesial streak; heavily granulose, head strongly triangular, bifid, sparsely granulose all over; horn long, feebly curved, granules very high; anal tergite with a higher granule at each side of the dark mesial streak.—Food-plants: *Juglans*, *Ostrya*.

Pupa opaque, head with four projections, antenna-case with a row of sharp granules or teeth, semites 4 to 6 of abdomen with a subapical carina which is dentate laterally in ♂, laterally and ventrally in ♀; tongue-case triangular, much shorter than the cases of the forelegs, reaching only one-third the way from its base to the apex of the wing-cases; abdominal segments 7 to 10 ventrally flat, the sides subcarinate, those of segment 8 expanded, armed with sharp teeth which point frontad, eighth segment humped dorsally in ♂; cremaster truncate, angles produced laterad into a sharp tooth.

Hab. Canada to Florida and Texas, westward to the Mississippi basin.

One species.

282. Cressonia juglandis.

Sphinx juglandis Abbot & Smith, *Lep. Georgia* i. p. 57. t. 29 (1797).
Sphinx instabilis Martyn, *Psyche* t. 20. f. 49; t. 21. f. 53 (1797).
Amorpha dentata juglandis, Hübner, *Samml. Ex. Schm.* i. t. 171 (1806-24).
Polyptychus juglandis, Hübner, *Verz. bek. Schm.* p. 141. n. 1516 (1822).
Smerinthus juglandis, Lepelletier & Serv., *l.c.* p. 441 (1825); Harris, in Sillim., *Journ. Sci. Art*

xxxvi. p. 292. n. 5 (1839); Walk., *List Lep. Ins. B. M.* viii. p. 247. n. 9 (1856) (N. York; Florida; Orilla, Can.); Fitch, *Rept. Ins N. York* iii. p. 462 (1856); Ménétr., *Enum. Corp. Anim. Petr., Lep.* p. 94. n. 1568 (1857); Clem., *Journ. Ac. Nat. Sci. Philad.* iv. p. 185 n. 90 (1859); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 213. n. 7 (1862); Lintn., *Proc. Ent. Soc. Philad.* iii. p. 668 (1864) (life hist.; on *Ostrya*, *Juglans*, *Carya*); Harr., ed. Flint, *Ins. Inj. Veg.* p. 328 (1865); Streck., *Lep. Rhop. Het.* p. 53. t. 7. f. 12 (♂). 13 (♀) (1873); Boisd., *Spec. Gén. Lép. Hét.* i. p. 27. n. 14 (1875) (descr. of larva and pupa); Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O.).

Bombyx (?) juglandis, Emmous, *Nat. Hist. N. Y.* v. t. 45. f. 9 (1854).

Cressonia juglandis, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 161. n. 74 (1865) (Atlantic distr.); iid., *l.c.* p. 186 (1865) (figs. of wings); Saund., *Canad. Ent.* i. p. 48 (1869) (sound of larva); Lintn., *Ent. Contr.* i. p. 192 (1872) (N. Y., b. vii.); Grote, *Bull. Buffalo Soc. N. H.* i. p. 24 (1874); id., *l.c.* ii. p. 50. 227. n. 45 (1875) (= *pallens*); Thaxt., *Psyche* i. p. 30 (1874) (Newton, Mass., e. vii.); Grote, *l.c.* iii. p. 223. n. 46 (1877) (Canada to Southern States); Butl., *Trans. Zool. Soc. Lond.* ix. p. 590. n. 1 (1877); Pack., *Ins. Inj. Forest Trees* p. 84 (1881); Reed, *Rept. Ent Soc. Ont.* xii. p. 63 (1882); Edw., *Papilio* iii. p. 25 (1883) (N. Jersey); Edw. & Ell., *ibid.* p. 127 (1883) (larva); Fern., *Sphing. N. Engl.* p. 81. n. 40 (1886); Holl., *Canad. Ent.* xviii. p. 105 (1886) (W. Pa. and S. Ind., larva common); Grote, *Hawk Moths N. Am.* p. 36 (1886); Smith, *Ent. Amer.* iii. p. 2 (1887) (struct. of ant.); id., *Trans. Amer. Ent. Soc.* xv. p. 230. t. 12. f. 1 (genit.). 2 (ant.). 3 (genit.), t. 13. f. 1 (venat.) (1888) (Canada to Georgia; westward to Mississippi, Texas); Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 44 (1889) (lit. relat. to metam.); Kirby, *Cat. Lep. Het.* i. p. 713. n. 1 (1892); Brehm, *Ent. News* viii. p. 21 (1897) (eggs May 20th); Bentenm., *Bull. Amer. Mus. N. H.* vii. p. 317. t. 7. f. 8 (1897) (larva, pupa; on hickory, walnut, and *Ostrya*; N. York, two broods); Hanb., *Canad. Ent.* xxix. p 292 (1897) (Manitoba); Rowl., *Ent. News* ix. p. 190 (1898) (Missouri; walnut, hickory); Hanb., *Canad. Ent.* xxxi. p. 52 (1899) (Manitoba); Heath, *ibid.* xxxiii. p. 99 (1901) (Manitoba).

Cressonia pallens Strecker, *Lep. Rhop. Het.* p. 54. t. 7. f. 14 (♀) (1873) (Texas); Butl., *l.c.* p. 590. n. 3 (1877); Kirby, *l.c.* p. 713. n. 4 (1892).

**Cressonia robinsoni* Butler, *l.c.* p. 590. n. 2 (1877) (N. York;—Mus. Brit.); Kirby, *l.c.* n. 3 (1892).

Cressonia hyperbola Slosson, *Ent. Amer.* vi. p. 59 (1890) (Florida); Kirby, *l.c.* n. 2 (1892).

♂♀. There is only one species of *Cressonia*; it varies in the tint of the ground-colour and also in the position of the lines. The individual described as *hyperbola* has the last antemedian and the first discal line fused behind; such aberrant individuals occur also in other genera, for instance in *Marumba*. We have examined specimens from various states of the South and North, and failed to find any local difference.

♂. Tenth tergite triangular (Pl. XXII. f. 17), elongate, gently curved, with almost parallel sides in apical half, convex above, concave below at end, apex rounded; sternite also triangular, pointed, slightly curved upwards at apex. Clasper sole-shaped, dorsal edge rather obviously concave basally; harpe produced into a triangular, obtusely pointed, distal process, which projects very little and has the dorsal edge denticulate (in Prof. Smith's description the harpe is erroneously said to project from the *superior* edge of the clasper). Penis sheath compressed, with an apical patch of minute tubercles or teeth which point distad.

♀. Eighth abdominal tergite sinuate, membranaceous mesially, more strongly chitinised laterally. Vaginal plate with a ridge before the orifice; the ridge cleft, the two halves strongly rounded; postvaginal part of plate membranaceous distally, rounded.

Early stages see above.

Hab. Canada to Florida and Texas, westwards to the Mississippi basin.

In the Tring Museum 6 larvae and 2 pupae, 23 ♂♂, 12 ♀♀ from: Toronto, Canada; N. Hampshire: N. Jersey; Quincy, Illinois; San Antonio, Texas; Sanford, Florida.

II. B. Sphingidae semanophorae.

♂♀. The not-scaled area of the inner surface of the first segment of the palpus covered with short sensory hairs, or these hairs, which are seldom vestigal,* restricted to a patch.

The number of species belonging to this division of the *Sphingidae* is about twice as large as that of the *Sphingidae asemanophorae*. Specialisation by reduction or loss, though not quite absent, is far less frequent in the present division than among the *Acherontiinae* and *Ambulicinae*, while the modification of organs in functionally higher structures is very often met with, the prevailing tendency in the *Sphingidae semanophorae* being progressive development in contradistinction to the *Sphingidae asemanophorae*, where retrogression is the prevalent feature in the development.

The tongue is never excessively long as it often is in *Acherontiinae*, nor is it ever so much reduced as in some *Acherontiinae* and many *Ambulicinae*, reaching always at least to the middle of the abdomen and remaining functional in all species. The pilifer is always prominent; it is peculiarly modified in the *Choerocampinae*; the bristles never become weak and flat or change into scales. The palpus varies very much in size, as does also the proportion in length between the first and second segments. In some genera the palpus is somewhat reduced (for instance in *Deidamia* and *Darapsa*), in others much enlarged (*Giganteopalpus*, *Elibia*, etc.). The longest Sphingid palpus is found in this division, namely in *Tinostoma*. Remarkable modifications of the palpus occur in the subfamily *Choerocampinae*. The antennae are no less variable. They are filiform or setiform in many species, without the indication of a club; in others they are moderately clubbed; in others again excessively so. The distal part may be abruptly recurved or scarcely curved at all. The end-segment is more often long than it is short, but the short end-segment is not at all of rare occurrence. The eye is lashed or not; its size is very different, *Oryba* having the largest eye of *Sphingidae*, while *Deidamia*, *Darapsa*, *Gurelca*, etc., have a comparatively small one. The head is sometimes crested, the crest being here, as in the *Sphingidae asemanophorae*, a sign of reduction of the head. The scales of the mesonotum form occasionally also a high, well-defined crest, which may be simple (*Epistor*), or double (*Dilophonota*). This thoracic crest is not a feature accessory to reduction. The abdomen is of interest in several respects. The first tergite and the sternite of the second segment become often closely appressed to the metathorax (*Macroglossum*, *Sesia*, etc.). The spines are never lost; there are two kinds of spination not found in the previous subfamilies—the uniserial conical spines of *Dilophonata*, *Pholus*, etc. (Pl. LXII. f. 9), and the flattened, very strongly chitinised spines of *Macroglossum*, *Sesia*, *Haemorrhagia*, etc. (Pl. LXII. f. 11). The spines of the basal sternite, which are at the highest vestigial in *Sphingidae asemanophorae*, are very distinct in quite a number of genera of the present division, and like those of the other sternites barely less strong than the dorsal ones in those forms which have the spination as represented by Pl. LXII. f. 11. The broad expansible fan-tail and, in the ♀, the broadly trapeziform seventh sternite which is *spinose* at the edge in a number of genera (Pl. LXIII. f. 5. 6), are characters confined † to members of this

* See *Odontosida* and *Gurelca*.

† Excepting the males of the Ambulicine genera *Cypa*, *Smerinthulus* and *Degmaptera*, which have also a fan-tail.

division. The friction-scales of the clasper (♂) are, as in the *Sphingidae asemanophorae*, often absent; but if they occur, they are erect or half erect, never forming a smooth patch as in *Acherontiinae* and *Ambulicinae*. They develop to large, strongly ribbed, often asymmetrical, lanceolate, pointed or truncate scales, which are easily recognised with the naked eye (Pl. LVIII. f. 37). If these scales are much enlarged, their number is reduced, the smallest number (one) being found in some *Choerocampinae*.

The legs offer also some peculiarities not met with among the previous subfamilies. The mid- and hindcoxal merum are carinate behind or are produced backwards into a large tooth in many *Sesiinae* and *Nephelicae* (Pl. LXIII. f. 2). The tibiae are rarely spinose, and the proximal pair of spurs of the hindtibia is absent from only one species (*Microsphinx pumilum*). The anterior tibia is occasionally produced into a thorn, as happens also among the *Sphingidae asemanophorae*. The comb of the mid- and hindtarsus is often present, but the spines are never much prolonged, a comb as represented by Pl. LXIV. f. 7 being confined to the *Acherontiinae*. The spurs appear often crested on the innerside, the scales being here raised, often spine-like, and we find occasionally a distinct comb of spines (Pl. LXIV. f. 8). The external spines of the mid- and hindtarsus are sometimes very numerous, short and strong, lying almost flat upon the tarsus (*Macroglossum*, *Atemnora*, etc.). The pulvillus does not disappear often, only one species of *Haemorrhagia*, *Arctonotus lucidus*, and *Euproserpinus phaeton* (we have not seen *Arctonotus terlooi* and *Euproserpinus euterpe*) being without it. The paronychium preserves as a rule the four lobes, with a few exceptions, the ventral lobes being occasionally reduced (*Gurelca*, *Sphingonaepiopsis*, etc.), or the paronychium being altogether vestigial (*Arctonotus*, *Euproserpinus*).

The wings are very variable in shape; the frenulum and retinaculum are always present.

The tongue-case of the pupa always reaches to the end of the wing-cases, never being abbreviated as in *Ceratomia* among *Acherontiinae* and in nearly all *Ambulicinae*. It is often enlarged frontad, and compressed, and projects in *Rhyncholaba* in a similar way as in *Protoparce*.

The larvae are not granulose as in *Ambulicinae*, nor have they ever a triangular head; they are also not regularly banded as in most *Protoparce*, *Hyloicus ligustri*, etc. The horn of the cylindrical larvae is often straight or curved forward, and is longest in the early stages; in the last stage it is occasionally reduced to a button-like tubercle. The anterior segments and the head are often reduced, and the third and fourth enlarged. Ocellated larvae occur only in the present division of the *Sphingidae*. A sharply marked dorso-lateral line running from head to horn is very often met with.

The ancestral forms from which this mass of species has developed are represented by *Pachylia*, *Pseudosphinx*, *Isognathus*, *Erinnyis*, *Grammodia*, and *Pholus*. The ancestral genera possessed non-clubbed antenna, with a long end-segment, which was, however, more elongate-bottle-shaped than filiform; a large palpus with the sensory hairs of the first segment occupying the whole non-scaled area of the inner surface; uniserial, long, stout, conical spines to the abdomen; in ♂ numerous small friction-scales not very different in size from the ordinary scales of the clasper; in ♀ a triangular non-spinose seventh sternite; a simply rounded merum to mid- and hindcoxae; fully developed pulvillus and paronychium; a comb of moderately long spines on the mid- and hindtarsi; a smooth, sub-

cylindrical, anteriorly evenly rounded pupa; and a cylindrical larva with long straight horn and rounded head.

The generalised genera mentioned before fall into two groups: *Pholus* with non-divided tenth abdominal segment of the ♂, and *Pseudosphinx* to *Grammodia* with symmetrically divided tenth ♂-segment. From *Pseudosphinx* and allies a series of genera leads upwards through *Pachylia*, *Hemeroplanes*, *Perigonia*, *Sesia*, to *Haemorrhagia*, *Cephonodes* and *Sataspes*. This is one main branch of the *Semanophorae*, giving rise to several small side-branches. The second series starts from *Pholus*, and divides soon into several branches.

Of all these issues from the ancestral *Semanophorae* only one group of genera is sharply circumscribed; it claims the rank of a subfamily. This group, which belongs to the *Pholus*-side of the *Sphingidae semanophorae*, comprises the genera *Theretra*, *Xylophanes*, *Pergesa* and allies, and is termed by us *Choerocampinae*. We may leave this subfamily out of consideration for the present. The remaining groups of *Semanophorae* are not so obviously distinguished from one another in all their members, owing to the preservation of generalised forms linking the groups together, and to the differences becoming obscured by the recurrence of similar structures in phylogenetically widely different genera. But we think it wise to give to each of the two natural sections, the *Pseudosphinx*-branch, and the *Pholus*-branch (exclusive of *Choerocampinae*), subfamily rank, the two subfamilies being designated as *Sesiinae* and *Philampelinae*, the former ending in *Sataspes*, the latter comprising as highly specialised members the genera *Macroglossum*, *Euproserpinus*, *Microsphinx*, *Elibia*, etc.

The *Sesiinae* are mostly American; they exhibit very often asymmetrical development of the copulatory apparatus in both sexes. The seventh sternite of the ♀ is large, quadrangular in a number of genera, and is in the higher forms spinose at the end like the preceding sternites. The friction-scales of the clasper are small in the lower genera and absent from the higher ones, never developing to large lanceolate scales as in the *Pholus*-series. The pupa has never a compressed *Theretra*-like tongue-case. The imago of the higher genera is mimetic (*Sataspes*, *Haemorrhagia*, etc.); mimetism is known also of some larvae of *Sesiinae* (*Hemeroplanes*, *Leucorhampha*).

The *Philampelinae*, on the other hand, are for the greater part inhabitants of the Old World; they have many affinities with the *Choerocampinae*, characters of the latter subfamily appearing frequently among them—for instance, the enlarged friction-scales, the compressed tongue-case of the pupa, the swollen third and fourth segments of the larvae, eye-spots, etc. The *Philampelinae* follow partly the *Choerocampinae* in the direction of development, partly the *Sesiinae*; the series *Nephele* to *Macroglossum* is Sesiad in several respects, and has, on account of this similarity, always been considered far more closely related to *Sesia*, *Haemorrhagia* and allies than to *Deilephila*, *Acosmeryx*, etc. The resemblance between *Sesia* and *Macroglossum*, for instance, is indeed surprising, referring to the antennae, the spination and anal tuft of the abdomen, and the midcoxal mernm.

Subfamily **Sesiinae**.—Typus: *Haemorrhagia tityus*.

Bombyliae Hübner, *Verz. bek. Schm.* p. 131 (1822) (partim).
Enmorphae id., *l.c.* p. 133 (1822) (partim).
Deilephilae id., *l.c.* p. 136 (1822) (partim).
Manducae id., *l.c.* p. 138 (1822) (partim).

Sesiidae Stephens, *Illustr. Brit. Ent., Haust.* i. p. 132 (1828) (partim; type: *Haemorrhagia fuciformis*).
Macroglossini Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 149 (1865) (*nom. nud.*; partim).
Chaerocampini iid., *l.c.* p. 153 (1865) (*nom. nud.*; partim).
Sphingini iid., *l.c.* p. 161 (1865) (*nom. nud.*; partim).
"Euryglottides" Boisduval, *Spec. Gén. Lép. Hét.* i. p. 68 (1875) (partim).
"Déilephilides" id., *l.c.* p. 158 (1875) (partim).
"Macroglossides" id., *l.c.* p. 289 (1875) (partim).
Macroglossinae Butler, *Trans. Zool. Soc. Lond.* ix. p. 516. 517 (1877) (partim; incl. type of *Sesiinae*); Smith, *Trans. Amer. Ent. Soc.* xv. p. 86 (1888) (partim).
Chaerocampinae Butler, *l.c.* p. 516. 544 (1877) (partim); Smith, *l.c.* p. 115 (1888) (partim).
Sphinginae Butler, *l.c.* p. 517. 598 (1877) (partim); Smith, *l.c.* p. 150 (1888) (partim).
Dilophonotidae Burmeister, *Descr. Rép. Argent.* v. p. 325 (1878).
Deilephilidae id., *l.c.* p. 336 (1878) (partim).
Pterogonidae id., *l.c.* p. 342 (1878) (partim).
Macroglossidae id., *l.c.* p. 356 (1878) (partim).
Smerinthinae, Smith, *l.c.* p. 212 (1888) (partim).

♂ ♀. Tenth abdominal segment mesially divided, often asymmetrical, the left half of the tergite and sternite, or the right half of the sternite, being sometimes reduced, vestigial, or even absent; right and left claspers occasionally also unequal; no large friction-scales. The lower genera with uniserial abdominal spines, at least on the last segments, the spines all long, or long ones alternating with small ones. The seventh sternite of the ♀ trapeziform, or sinuate, often spinose at the apical edge, sometimes only laterally; if the sternite is small and triangular, and the spination of the tergites multiserial, the mesonotum is prominently crested or the palpus angulate laterally.

One hundred and thirty-three species belonging to twenty-four genera. One genus is Holarctic (*Haemorrhagia*), extending into the Oriental Region; one is Oriental (*Sataspes*), and one Aethiopian and Oriental (*Cephonodes*); all the others are American.

Two tribes, *Dilophonoticae* and *Sesiicae*.

Key to the genera:

a. Spines of abdomen not uniseriate, those of proximal row of tergites broader than long . . . . . *v*.
Spines of proximal row of tergites longer than broad . . . . . *k*.
Spines of distal tergites uniseriate, all long, or long and short ones alternating . . . . . *b*.

b. Basal sternite of abdomen with strong spines . . . . . XCIII. *Oryba*.
Basal sternite of abdomen with few weak spines, or not spinose . . . . *c*.

c. Posterior tergites with long and small spines alternating . . . . . *d*.
Posterior tergites with long spines only, or with very few short ones . . . *f*.

d. Hindwing ochraceous or cinnamon-rufous, or thorax crested . . XCVI. *Hemeroplanes*.
Not so . . . . . *e*.

BRITISH MUSEUM
NATURAL HISTORY

[Facing p. 850.

SATAS'PES
Antenna not clubbed in ♂
Antenna slightly clubbed in ♀
Antenna with end-segment long.
Eye lashed.
Angle of midcoxal merum not prominent
Angle of hindcoxal merum vestigial.
Cell of hindwing more than twice as long as broad.
Spines of proximal row on tergites and sternites longer than broad.
Seventh sternite (♀) spinose.
No friction-scales.
Paronychium and pulvillus normal.
SC^3 and SC^4 of forewing anastomosed at end
Sexual armature symmetrical

CEPHONODES.
Antenna strongly clubbed.
Antenna with end-segment long.
Eye not lashed.
Mid- and hindcoxal merum strongly angulate.
Cell of hindwing very short.
Spines of proximal row on sternites and tergites shorter than broad; strong on basal sternite.
Seventh sternite (♀) spinose.
Clasper without friction-scales.
Paronychium and pulvillus normal.
SC^3 and SC^4 of forewing anastomosed at end.
Sexual armature asymmetrical.

HAEMORRHAGIA
Antenna strongly clubbed
Antenna with end-segment long
Eye strongly lashed.
Mid- and hindcoxal merum angulate
Cell of hindwing normal
Spines of proximal row on sternites and tergites shorter than broad; strong on basal sternite
Seventh sternite (♀) spinose.
Clasper without friction-scales
Paronychium and pulvillus normal or reduced.
SC^3 and SC^4 of forewing anastomosed at end
Sexual armature asymmetrical.

SESIA
Antenna hiform or clubbed
Antenna with end-segment long.
Eye feebly lashed.
Mid- and hindcoxal merum strongly angulate
Spines of first row on tergites and sternites short and broad, basal sternite strongly spinose
Seventh sternite (♀) spinose.
Clasper without friction-scales
Paronychium and pulvillus normal.
SC^3 and SC^4 of forewing anastomosed at end.
Vaginal orifice not mesial

ENYO
Like *Aleuron*, but tibiæ spinose

ALEURON
Antenna not clubbed.
Antenna with end-segment short
Palpus angulate
Spines of abdomen multiserial, weak, elongate; none on basal sternite.
Seventh sternite trapeziform, not spinose.
Mid- and hindcoxal merum not angulate
Clasper with small friction-scales
Sexual armature asymmetrical

PROTALEURON
Like *Aleuron*, spines of posterior tergites uniserial, long, strong
Sexual armature symmetrical.

STOLIDOPTERA
Like *Aleuron*, palpus not angulate
Spines of posterior tergites uniserial, long, strong
Sexual armature symmetrical

EUPYRRHOGLOSSUM
Like *Sesia*, SC^3 and SC^4 of forewing not anastomosed.

PERIGONIA.
Antenna not clubbed
Antenna with end-segment long or short.
Eye feebly lashed.
Midcoxal merum angulate.
Hindcoxal merum not angulate
Spines of first row on tergites and sternites elongate; basal sternite spinose
Seventh sternite (♀) spinose.
Clasper without friction-scales
Paronychium and pulvillus normal.
SC^3 and SC^4 of forewing not anastomosed.
Sexual armature symmetrical or slightly asymmetrical

NYCERYX
Like *Perigonia*, apex of forewing sinuate; clasper with friction-scales
♂ sexual armature asymmetrical or not

CAUTETHIA
Like *Himantoides*, antenna shorter, legs normally scaled.

HIMANTOIDES
Like *Pachygonia*, end-segment of antenna longer, edge of seventh sternite (♀) entirely spinulose.
First hindtarsal segment tufted

PACHYGONIA
Antenna setiform.
Antenna with end-segment short.
Abdominal spines elongate; basal sternite spinose.
Seventh sternite (♀) spinose laterally
Mid- and hindcoxal merum not angulate.
Clasper without friction-scales.
Hindtarsus tufted.
♂ sexual armature simple.

EPISTOR.
Antenna clubbed.
Antenna with end-segment short
Abdominal spines elongate, weak; basal sternite not distinctly spinose.
Seventh sternite (♀) not spinose, small.
Mid- and hindcoxal merum not angulate.
Clasper with small friction-scales
♂ sexual armature slightly asymmetrical, simple.

MADORYX AND HEMEROPLANES.
Antenna not clubbed; end-segment long
Spines of abdomen uniserial, those of posterior tergites alternately long and short, few spines on basal sternite.
Seventh sternite (♀) large, not spinose
Angle of midcoxal merum vestigial.
Clasper with friction-scales.
Sexual armature symmetrical.

ORYBA
Antenna clubbed, end-segment long
Palpus small
Eye enlarged.
Spines of abdomen uniserial, strong, long and short ones alternating; basal sternite with strong ones.
Seventh sternite (♀) trapeziform, without spines.
Midcoxal merum angulate.
Sexual armature symmetrical.
Friction-scales small, or replaced by long strong hairs

LEUCORHAMPHA
Like *Madoryx*, but posterior tergites with long spines only

[illegible]AMMOTHA
As *Arsenura* but wing not scalloped

EUNYTIS
As *Isognathus* crest of head ended
Crest of thorax high
Horn of larva short

PSEUDOSPHINX
Like *Isognathus*, thorax more strongly crested

ISOGNATHUS
Merum of midcoxa with indication of angle.
Abdominal spines uniserial
Seventh sternite of ♀ elongate-trapeziform, not spinose at edge.
Head and thorax crested.
Forewing scalloped.
Sexual armature symmetrical.
Numerous small friction-scales on clasper
Three-tufted tail in ♂; single-tufted one in ♀.
Horn of larva long.

PACHYLIA.
Antenna not clubbed, end-segment long.
Midcoxal merum angulate.
Spines of abdomen uniserial, very strong, conical; basal sternite with some very weak ones.
Seventh sternite (♀) not spinose.
Clasper with small friction-scales.
Sexual armature symmetrical or not

PHILAMPELINAE.

CHOEROCAMPINAE.

SESIIDAE.

DILOPHONOTICAE.

SESIINAE

SPHINGIDAE ASEMANOPHORAE.

SPHINGIDAE SEMANOPHORAE.

SPHINGIDAE.

e. Forewing angulate	XCV. *Madoryx.*
Forewing not angulate . . .	XCII. *Pachylia.*
f. Thorax not crested	. . *g.*
Thorax crested	. . *h.*
g. Forewing angulate	XCIV. *Leucorhampha.*
Forewing not angulate . . .	XCII. *Pachylia.*
h. Forewing dentate	. . *i.*
Distal margin quite even . . .	XCI. *Grammodia.*
i. Hindwing yellow	. . *j.*
Hindwing tawny rufous, at least at base beneath	XC. *Erinnyis.*
Hindwing grey and black . . .	LXXXVIII. *Pseudosphinx.*
j. Crest of thorax high	XC. *Erinnyis.*
Crest of thorax not high . . .	LXXXIX. *Isognathus.*
k. Tibiae spinose	C. *Enyo.*
Tibiae not spinose	. . *l.*
l. End-segment of antenna long, filiform	. . *t.*
End-segment of antenna short, not filiform.	. . *m.*
m. Midcoxal merum angulate. . .	CVI. *Perigonia.*
Midcoxal merum not angulate . .	. . *n.*
n. Spines of posterior tergites uniserial .	. . *o.*
Spines of posterior tergites not uniserial	. . *p.*
o. Palpus angulate laterally . . .	XCVIII. *Protaleuron.*
Palpus not angulate laterally . .	XCVII. *Stolidoptera.*
p. Palpus angulate laterally . . .	XCIX. *Aleuron.*
Palpus not angulate laterally . .	. . *q.*
q. Thorax with high crest . . .	CI. *Epistor.*
Thorax not crested	. . *r.*
r. First hindtarsal segment and hindtibia appearing compressed on account of the long crest-like scaling . .	. . *s.*
Scaling of hindleg normal . . .	CIV. *Cautethia.*
s. Hinder angle of forewing produced backwards	CII. *Pachygonia.*
Hinder angle of forewing not produced backwards	CIII. *Hemantoides.*
t. SC^3 and SC^4 of forewing anastomosed at end. Mimetic, resembling *Xylocopa*	CXI. *Sataspes.*
SC^3 and SC^4 of forewing not anastomosed at end	. . *u.*
u. Apex of forewing acute . . .	CVI. *Perigonia.*
Apex of forewing sinuate . . .	CV. *Nyceryx.*
v. Cell of hindwing very short, R^3 and M^1 on a stalk	CX. *Cephonodes.*
Cell of hindwing about twice (or thrice) as long as broad . . .	. . *w.*

w. Antennae very strongly clubbed in both sexes ; eye strongly lashed .	CIX. *Haemorrhagia*.
Antenna not, or moderately, clubbed ; eye feebly lashed	*x*.
x. SC^3 and SC^4 of forewing anastomosed at end	CVIII. *Sesia*.
SC^3 and SC^4 of forewing not anastomosed at end	CVII. *Eupyrrhoglossum*.

Tribe **Dilophonoticae**.—Typus : *Erinnyis ello*.

Dilophonotidae Burmeister, *Descr. Rép. Argent.* v. p. 325 (1878).

♂♀. Thorax with double crest ; head also crested. Merum of midcoxa with indication of angle. Spines of abdomen uniseriate (Pl. LII. f. 9), no short spines on posterior tergites.

Hab. Neotropical Region.

Four genera ; nineteen species.

LXXXVIII. PSEUDOSPHINX.—Typus : *tetrio*.

Sphinx Linné *et auct. vetust.* (partim).
Hyloicus Hübner, *Verz. bek. Schm.* p. 139 (1822) (partim : type : *pinastri*).
Pseudosphinx Burmeister, *Sphing. Bras.* p. 68 (1856) (type : *tetrio*).
Macrosila Walker, *List Lep. Ins. B. M.* viii. p. 198 (1856) (partim).
Protoparce, Butler (*non* Burmeister, 1858), *Proc. Zool. Soc. Lond.* p. 484 (1878).

♂♀. Very close to *Erinnyis* and *Isognathus* ; spines of abdominal sternites weaker than in *Erinnyis*, being thinner and more lanceolate ; crest of mesonotum higher and shorter, less gradually fading away behind, mesonotum comparatively shorter.

♂. Process of harpe entire. Tenth abdominal sternite a little longer than the tergite (as is also the case in *Erinnyis*, but not in *Isognathus*).

Larva with long filiform horn ; head large ; body black with yellow rings in all stages.—Food-plants : *Euphorbiaceae*, especially *Plumeria*.

Pupa polished, strongly glossy, with scarcely any puncturation ; frontal tubercles vestigial.

Hab. Tropical and Subtropical America.

One of the commonest species of *Sphingidae*.

The name *Pseudosphinx* is very appropriate. The insect has the appearance of a species of *Sphingicae*, into which tribe nearly all authors have put it. There was, however, no excuse for being misled by the general resemblance of *tetrio* to *Protoparce florestan* and others—striking though it is—after Burmeister had pointed out the true relationship with *Erinnyis* and *Isognathus*. The agreement in structure of these two genera and *Pseudosphinx* is so great that the differences in the imagines would not count for anything if they were not accompanied by differences in the larvae, as is the case in *Erinnyis* on one side, and *Pseudosphinx* and *Isognathus* on the other. These latter two genera have been united by Burmeister, and we must say that there is ample justification for this course ; in fact, we keep *Isognathus* separate from *Pseudosphinx*, not because there are any obvious diagnostic characters, but on the consideration that the very difficult species of

Isognathus are *inter se* more closely related than with the easily recognised *tetrio*, as is shown by the crest of the head and thorax, the colour, and the sexual armature differing somewhat in *Isognathus* and *Pseudosphinx*.

The yellow-ringed larva with red head, red anal segment, and red legs resembles that of certain *Saturniidae*. This similarity is the more suggestive as the oblique side-bands of the equally low-organised *Pachylia* and *Pholus*—which run in the opposite direction to that of the bands of *Protoparce*, *Hyloicus*, *Sphinx*, etc.—are also met with among American *Saturniidae*.

283. Pseudosphinx tetrio.

Merian, *Metam. Surin. Ins.* t. 5 (cruca) (1705).

Sphinx tetrio Linné, *Mant. Plant.* p. 538 (1771) (Am. mer.); Mull., *Naturs., Suppl.* p. 301. n. 5. b (1774); Fabr., *Syst. Ent.* p. 540. n. 14 (1775) (partim); Goeze, *Ent. Beytr.* iii 2. p. 203. n. 2 (1780); Fabr., *Spec. Ins.* ii. p. 145. n. 27 (1781) (partim); id., *Mant. Ins.* ii. p. 96. n. 30 (1787) (partim); Gmel., *Syst. Nat.* i. 5. p. 2375. n. 61 (1790); Fabr., *Ent. Syst.* iii. 1. p. 366. n. 32 (1793) (partim); Burm., *Abh. Nat. Ges. Halle* p. 60 (1854) (= *hasdrubal*); Dew., in Wiegm., *Arch. Naturg.* xliv. 1. p. 9. t. 1. f. 10. 11 (1878) (larva).

Sphinx plumierine Fabricius, *l.l.c.c.*

Sphinx hasdrubal Cramer, *Pap. Exot.* iii. p. 90. t. 246. f. F (1779) (Surinam; Curaçao).

Hyloicus hasdrubal, Hübner, *Verz. bek. Schm.* p. 139. n. 1488 (1822).

Sphinx asdrubal (!), Poey, *Cent. Lep.* t. 11 (1832) (Cuba; larva, pupa); id., *Mem. Hist. Nat. Cuba* i. p. 197. n. 10 (1851) (larva).

Sphinx rustica, Sepp (*non* Fabricius, 1775), *Surin. Vlind.* iii. t. 101 (1852).

Pseudosphinx tetrio, Burmeister, *Sphing. Bras.* p. 64 (1856); Grote, *Proc. Ent. Soc. Philad.* v. p. 64 (1865); id. & Rob., *ibid.* p. 161. n. 75 (1865); Walk., *List Lep. Ins. B. M.* xxxv. p. 1854 (1856) (= *hasdrubal*); Butl., *Trans. Zool. Soc. Lond.* ix. p. 610. n. 1 (1877); Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico); Burm., *Descr. Rép. Argent.* v. p. 326. n. 1 (1878); id., *l.c. Atlas* p. 33. 34. t. 13. f. 3 (*l.*). 7 (*p.*) (1879); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 22. n. 1 (1881); Gundl., *Contr. Ent. Cubana* p. 203 (1882); Edw., *Canad. Ent.* xx. p. 12 (1887) (Arizona; N.W. Texas); id., *Ent. Amer.* iii. p. 164 (1887) (Florida); id., *l.c.* iii. p. 223 (1888); Riley, *Ins. Life* ii. p. 379 (1890) (at sea in Gulf of Mexico); Kirby, *Cat. Lep. Het.* i. p. 682. n. 1 (1892); Rothsch., Nov. Zool. i. p. 90 (1894) (= *obscura*); Druce, *l.c. Suppl.* p. 316 (1896); Bönningh., *Iris* xii. p. 117. n. 22 (1899); Hamps., *Ann. Mag. N. H.* (7). vii. p. 251 (1901) (Bahamas); Kaye, *Trans. Ent. Soc. Lond.* p. 139 (1901) (Trinidad).

Macrosila hasdrubal, Walker, *List Lep. Ins. B. M.* viii. p. 202. n. 6 (1856); Ménétr., *Enum. Corp. Anim. Mus. Petr.* ii. p. 89. n. 1468 (1857); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 161. n. 53 (1859); id., in Morris, *Syn. Lep. N. Am.* p. 184. n. 2 (1862).

Sphinx? tetrio, Walker, *l.c.* p. 263 (1856).

Macrosila asdrubal (!), Lucas, in Sagra, *Hist. Cuba* vii. p. 295 (1856); Herr.-Sch., *Corresp. Bl.* p. 59 (1865); Boisd., *Consid. Lép. Guatemala* p. 72 (1870); Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 264 (1882).

Macrosila tetrio, Boisd. *Spec. Gén. Lép. Hét.* i. p. 61 (1875); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 345 (1876) (Surinam); Snell., *Tijdschr. Ent.* xxx. p. 33 (1887) (Curaçao).

**Pseudosphinx obscura* Butler, *l.c.* n. 2 (1877) (Honduras; N. Granada; Brazil; Mus. Brit.); Kirby, *l.c.* n. 2 (1892).

Protoparce tetrio, Butler, *Proc. Zool. Soc. Lond* p. 484. n. 64 (1878) (Jamaica).

Sphinx (*Pseudosphinx*) *tetrio*, Dewitz, *Nova Act. Leop. Car. Ac. Nat.* xliv. 2. p. 250. t. 1. f. 2. 2a (*l.* juv.) (1882).

♂♀. The ♂ is darker than the ♀; both sexes are individually variable in colour and size. Butler's *obscura* is based on specimens with an average amount of black-brown on the wings; there occur individuals which are much darker than the type of *obscura*.

♂. Tenth segment broad (Pl. XLI. f. 19. 20. 21), sternite and tergite close together, the processes of the former acute, curved at end. Clasper with a great number of friction-scales (Pl. LVIII. f. 36); harpe ending in a long, obtuse, somewhat spatulate process with entire edges (Pl. XLV. f. 19). Penis-sheath

(Pl. LIII. f. 7) of the same type as in *Madoryx*, the apical edge dentate at the left and right side as shown in figure.

♀. Eighth tergite sinuate ; membranaceous mesially. Vaginal plate pitchy black, large, connecting membrane between vaginal plate and seventh sternite long, transversely folded ; vaginal plate very uneven, a ridge or carina proximally of the ovate orifice, curving distad laterally, limiting a broad lateral groove ; two smaller grooves behind the orifice, separated by a carinated fold. Seventh sternite longer than basally broad.

Hab. Tropical and Subtropical America : Florida, West Indies, southward to Paraguay and Southern Brazil.

Very common.

In the Tring Museum 2 larvae, 1 pupa, 200 odd specimens from : Jamaica ; Haiti ; Cuba ; Mexico southwards to Bolivia and Rio de Janeiro.

LXXXIX. ISOGNATHUS.—Typus : *scyron.*

Sphinx Linné, *Mus. Lud. Ulr.* p. 350 (1764) (partim).
Erinnyis Hübner, *Verz. bek. Schm.* p. 139 (1822) (partim ; type : *ello*).
Dilophonota Burmeister, *Sphing. Bras.* p. 68 (1856) (partim ; type : *ello*).
Anceryx Walker, *List Lep. Ins. B. M.* viii. p. 222 (1856) (partim ; type : *pinastri*).
Isognathus Felder, *Wien. Ent. Monatschr.* vi. p. 187 (1862) (type : *scyron*).
Tatoglossum Butler, *Trans. Zool. Soc. Lond.* ix. p. 598 (1877) (type : *caricae*).

♂ ♀. Agreeing closely with *Pseudosphinx* and *Erinnyis*; robust ; crest of thorax small ; crest of occiput not divided ; second abdominal tergite tufted above (in well preserved individuals), seventh tergite and sternite of ♀ shorter than basally broad ; process of tenth sternite of ♂ a little shorter than the tergite ; harpe transversely ribbed (Pl. XLV. f. 25) ; R^3 and M^1 of hindwing less close together than in *Erinnyis*.

Caterpillar as in *Pseudosphinx* ; body yellow or white, marked with various designs in black, sometimes appearing black with pale rings ; horn long and thin, rough with setiferous tubercles, which are dense distally (in all species ?) ; anal tergite without the two high tubercles of *Pseudosphinx*.—Food-plants : *Plumeria* and other *Euphorbiaceae*.

Pupa stouter than in *Erinnyis*, paler, the black streaks more conspicuous (Burmeister's figure correct ? ; his "*scyron*" pupa is darker in colour than the two *Erinnyis*-pupae figured on the same plate).

Hab. Tropical and Subtropical America, from Mexico to Buenos Aires ; Cuba, Haiti, Porto Rico.

The sexual armature does not present any apparent differences in the various species, which are partly difficult to distinguish.

Key to the species :

a. Veins of hindwing above striped with black in outer half . . . . . 291. *I. caricae*.
Veins of hindwing above not striped with black in outer half . . . . . *b*.
b. Abdomen not distinctly banded . . . . *c*.
Abdomen with black and whitish grey bands . *d*.
c. Spot in apex of cell of forewing and dot outside D^3 distinctly separate . . . 284. *I. leachi*.

	Spot in apex of cell and dot outside D^3 more or less completely merged together	285. *I. swainsoni.*
d.	Underside of abdomen white, with conspicuous black dots	290. *I. excelsior.*
	Underside of abdomen grey shaded with brown	*e.*
e.	Forewing above almost entirely blackish brown; border of hindwing reaching halfway to cell	288. *I. congratulans.*
	Forewing above brown, with little grey scaling and a russet patch on disc; border of hindwing not reaching halfway to cell	286. *I. scyron.*
	Forewing grey or white, at least in apical third	*f.*
f.	Thorax and forewing ashy grey . . .	287. *I. menechus.*
	Thorax and forewing chalky grey . .	289. *I. rimosae.*

284. Isognathus leachi.

Sphinx leachi Swainson, *Zool. Illustr.* iii. t. 150. f. 1 (1823) (Brazil).

Anceryx scyron, Walker (*non* Cramer, 1780), *List Lep. Ins. B. M.* viii. p. 225. n. 5 (1856) (partim; Villa Nova).

Isognathus leachi, Felder, *Wien. Ent. Mon.* vi. p. 183 (1862); Butl, *Trans. Zool. Soc. Lond.* ix. p. 602. n. 6 (1877); Kirby, *Cat. Lep. Het.* i. p. 698. n. 12 (1892) (Brazil).

Anceryx leachi, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 125. n. 8 (1875) (partim ?).

**Anceryx cahuchu* id., *l.c.* p. 122. n. 4 (1875) (coll. Charles Oberthür).

**Isognathus metascyron* Butler, *Proc. Zool. Soc. Lond.* p. 258. n. 51 (1875) (Villa Nova;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 602. n. 7. t. 94. f. 7 (♀) (1877).

Pseudosphinx scyron, Burmeister (*non* Cramer, 1780), *Descr. Rép. Argent.* v. p. 327. n. 2 (1878) (partim).

Isognathus cahuchu, Butler, *l.c.* p. 629 (1877); Kirby, *l.c.* n. 6 (1892).

(?) *Isognathus pedilanthi*, Bönninghausen, *Iris* xii. p. 117. n. 23 (1899).

♂ ♀. Bands of abdomen not distinct.

Wings, *upperside*.——Forewing: basal mesial elongate patch about 2½ mm. broad; cross-vein D^3 pale, separating distinctly a rounded spot from the patch situated in the cell; black discal streak R^3—M^1 heavy, more or less connected with the curved patch behind M^2; greyish white scaling sparse, no distinct grey interrupted vein-streaks posteriorly on disc.——Hindwing: marginal band distinctly and almost regularly dentate, not constant in width.

Amount of yellow on underside variable.

Larva not known with certainty. Bönninghausen says of the larva of what he calls *pedilanthi*, that it is marked with brown, black, and grey, and has no rings; his *pedilanthi* may be this or the following species.

Hab. South America: Surinam to Southern Brazil.

In the Tring Museum 4 ♂♂, 3 ♀♀ from: Leopoldina; Minas Geraës, 12. xii., 19. ii. (Kennedy); Rio Negro (Pratt); Cayenne.

In the Paris Museum from the frontier of Uruguay.

285. Isognathus swainsoni.

Anceryx scyron, Walker (*non* Cramer, 1780), *l.c.* viii. p. 225. n. 5 (1856) (partim; Brazil).

Isognathus swainsoni Felder, *Wien. Ent. Mon.* vi. p. 187. n. 175 (1862) (Rio Negro); Butl., *Trans. Zool. Soc. Lond.* ix. p. 602. n. 9 (1877); Kirby, *Cat. Lep. Het.* i. p. 698. n. 10 (1892).

**Isognathus famosa* Butler, *Proc. Zool. Soc. Lond.* p. 258. n. 50 (1875) (Brazil ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 601. n. 5 (1877).
Isognathus famosus, Kirby, *l.c.* n. 7 (1892).
(?) *Isognathus pedilanthi*, Bönninghausen, *Iris* xii. p. 118. n. 24 (1899).

♂ ♀. Abdominal bands not distinct.

Wings, *upperside*.——Forewing with more white scaling than the preceding species, the interrupted white vein-streaks all over the outer half of the wing ; the blackish brown spot at apex of cell and that at outer side of D^3 not distinctly separate, more or less completely merged together ; basal patch thinner than in *leachi*, and cellule M^1—M^2 less shaded with brown ; patch R^3—M^1 separated from the patch behind M^2, but joined to the cell-patch ; marginal spots at ends of veins larger and paler grey than in *leachi*.——Hindwing : marginal band not dentate, or only very faintly so, on the whole broader than in *leachi*.

Hab. South America : Surinam southward to South Brazil.

In the Tring Museum 3 ♂♂, 4 ♀♀ from : Leopoldina ; Rio de Janeiro ; Chanchamayo, Peru.

In the Bern Museum from Para, at the electric light, vii. viii. (Dr. Göldi).

There is in the Felder collection a specimen of this species labelled " Qreg." ; it may be the type.

286. Isognathus scyron.

Sphinx scyron Cramer, *Pap. Exot.* iv. p. 23. t. 301. f. E (1780) Surinam).
Eriunyis scyron, Hübner, *Verz. bek. Schm.* p. 139. n. 1491 (1822).
Anceryx scyron, Walker, *List Lep. Ins. B. M.* viii. p. 225. n. 5 (1856) (partim) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 121. n. 3 (1875) (♀, Cayenne ; cit. Merian ad aliam spec. pertinet) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 346 (1876) (Paramaribo ; = ? *pedilanthi*).
Isognathus scyron, Felder, *Wien. Ent. Mon.* vi. p. 187 (1862) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 602. n. 8 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 698. n. 9 (1892) ; Schaus, *Ent. News* ix. p. 136 (1898) (= *pedilanthi*) ; Kaye, *Trans. Ent. Soc. Lond.* p. 138. t. 5. f. 12 (♀) (1901) (Trinidad).
**Anceryx pedilanthi* Boisduval, *l.c.* p. 124. n. 6. t. 7. f. 1 (♂) (1875) (Cayenne ;—coll. Charles Oberthür) ; Kirby, *l.c.* n. 8 (1892).
Pseudosphinx scyron, Burmeister, *Descr. Rép. Argent.* v. p. 327. n. 2 (1878) (partim).

♂ ♀. Abdominal bands distinct. Thorax and forewing above russet-drab-brown ; underside of abdomen buffish dirty white, slightly speckled with russet scales.

Wings, *above*.——Forewing in outer half with grey vein-streaks, interrupted by black dots which represent transverse lines ; ♂ with black discal dash R^3—M^1, and another smaller one M^1—M^2, these dashes situated in a pale russet area which is not clearly defined though obvious, being most distinct between R^1 and R^3 ; ♀ without the black dashes, but with the russet area well marked (as in Cramer's figure).

Early stages not known.

Hab. South America : Venezuela, Trinidad, and Para.

In the Tring Museum 11 ♂♂, 7 ♀♀ from : Aroa and Valencia, Venezuela ; Cayenne ; Rio Demerara ; Trinidad.

In the Bern Museum from Para, at the electric light, iii. vii. (Dr. Göldi).

287. Isognathus menechus.

Anceryx scyron, Walker (*non* Cramer, 1780), *l.c.* viii. p. 225. n. 5 (1856) (partim ; Villa Nova).
(?) *Sphinx menechus* Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. p. 90. n. 1497 (1857) (Cayenne ; *nom. indescr.*).

**Anceryx menechus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 124. n. 7 (1875) (Cayenne ;—coll. Charles Oberthür).
Anceryx rimosa, id., *l.c.* p. 125. n. 9 (1892) (partim ; Brazil).
**Anceryx pelops* id., *l.c.* p. 126. n. 11 (1875) (hab. ? ;—coll. Charles Oberthür).
**Isognathus amazonicus* Butler, *Trans. Zool. Soc. Lond.* ix. p. 601. n. 3. t. 94. f. 8 (1877) (Villa Nova ;—Mus. Brit.) ; Kirby, *Cat. Lep. Het.* i. p. 698. n. 5 (1892).
Pseudosphinx seyron, Burmeister, *Descr. Rép. Argent.* v. p. 327. n. 5 (1878) (partim) ; id., *l.c. Atlas* p. 32. t. 13. f. 4 (*l*) (1879).
Isognathus menechus, Kirby, *l.c.* n. 13 (1892).
Isognathus pelops, id., *l.c.* n. 15 (1892).
Isognathus seyron, Bönninghausen, *Iris* xii. p. 117. n. 23 (1899) (larva ; Rio de Janeiro).

♂♀. A heavy-bodied species. Bands of abdomen well marked, often not distinctly interrupted above. Body and forewings of a peculiar bluish grey colour.

Wings, *above*.——Forewing with an antemedian and a discal pair of lines, more or less distinct at costal margin, the discal pair generally interrupted at R^2, reappearing behind, here concave and connected with the antemedian pair, forming with this a kind of half-ring opening at hinder margin ; a discal elongate black patch R^3—M^1 invading the discal pair of lines ; the white discal vein-streaks generally conspicuous.——Border of hindwing variable in width.

Amount of yellow on underside also variable.

Larva like that of *Pseudosphinx tetrio*, with white rings ; head, anal segment and abdominal feet orange-red (Burmeister).

Hab. South America : Surinam to Espirito Santo, perhaps more widely distributed.

In the Tring Museum 10 ♂♂, 6 ♀♀ from : Amazons ; Bahia ; Espirito Santo.

The *type* of *pelops* is in very bad condition. We cannot say with certainty whether it belongs here or to some other species.

288. Isognathus congratulans.

Erinnyis congratulans Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 167. n. 105 (1865) (Cuba ; *nom. indescr.*) ; Grote, *Ann. Lyc. N. York* viii. p. 200 (1865) (Cuba).
Dilophonota congratulans, id., *Proc. Ent. Soc. Philad.* vi. p. 329 (1867) (Cuba).
Isognathus congratulans, id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) (Cuba) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 601. n. 4 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 698. n. 4 (1892).
Sphinx congratulans, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 558 (1875).
Dilophonota rimosa, Gundlach (*nom* Grote, 1865), *Contr. Ent. Cubana* p. 215 (1881).

♂. Bands of abdomen distinct. Forewings, above, for the greater part blackish brown. This may be an extreme variety of *rimosa*.

Hab. Cuba.

In the Tring Museum 1 ♂ from Cuba ; also in the Berlin Museum.

289. Isognathus rimosa.

Erinnyis rimosa Grote, *Proc. Ent. Soc. Philad.* v. p. 73. t. 2. f. 1 (♂) (1865) (Cuba).

♂♀. Body paler than in *menechus* and *seyron* ; abdominal bands distinct. Ground colour of forewing, above, chalky ; white marginal spots larger and hindwing paler yellow than in *menechus*.

Larva known of two of the three subspecies (see below), younger stages different in colour and markings from adult caterpillar. Head and underside grey ; longitudinal stripes on back and irregular lateral markings.

Hab. Neotropical Region : West Indies, Mexico, southward to Northern Brazil.

Three subspecies :

a. I. rimosa rimosa.

Anceryx scyron, Walker (*non* Cramer, 1780), *l.c.* viii. p. 225. n 5 (1856) (partim ; Haiti) ;
Anceryx menechus ?, Herrich-Sch., *Corresp. Bl.* p. 150 (1863).
Anceryx scyron ?, id., *l.c.* p. 59 (1865).
Erinnyis rimosa Grote, *l.c.* p. 73. t. 2. f. 1 (♂) (1865) (Cuba).
Erinnyis menechus id., *l.c.* v. p. 75 (1865) ; id. & Rob., *ibid.* v. p. 167. n. 104 (1865).
Dilophonota rimosa Grote, *l.c.* vi. p. 329 (1867) (Cuba) ; Gundl., *Contr. Ent. Cubana* p. 215 (1881) (descr. of larva and pupae).
Isognathus rimosus (!) Grote, *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) (Cuba) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 601. n. 1 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 698. n. 3 (1892).
Anceryx andae Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 77 (1868) (*nom. nud.*) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 125. n. 9 (1875) (partim).
Anceryx rimosa id., *l.c.* p. 125. n. 9 (1875) (partim) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 346 (1876) (quite distinct from *scyron*) ; Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico).

♂ ♀. Mesothoracic tegula without brown mesial stripe ; black basal patch of forewing absent or small ; black border of hindwing broad, reaching at R^3 nearly halfway to cell ; ♀ without black streak R^3—M^1 on forewing (always ?).

Larva described by Gundlach, *l.c.*, on *Plumeria*.

Hab. West Indies : Cuba ; Haiti ; Porto Rico.

In the Tring Museum 1 ♂, 1 ♀ from Cuba.

b. I. rimosa inclitus.

Isognathus scyron, Druce (*non* Cramer, 1780), in *Biol. Centr. Amer., Lep. Het.* i. p. 18. n. 1 (1882) (Chiriqui).
Isognathus inclitus Edwards, *Ent. Amer.* iii. p. 90 (1887) (Mexico) ; Bentenm., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (Jalapa, specimens from coll. Hy. Edwards) ; Kirby, *Cat. Lep. Het.* i. p. 698. n. 2 (1892) ; Druce, *l.c. Suppl.* p. 312. n. 2 (1896) (Mexico ; Guatemala ; Nicaragua ; Costa Rica).

♂ ♀. Mesothoracic tegula with brown streak. Forewing, above, much more variegated with blackish brown than in *rim. rimosa*, and the markings heavier ; border of hindwing not reaching halfway to cell at R^3 ; ♀ with forewing much more shaded with black, especially near hinder margin.

Larva : W. Schaus sends us the following description :

"The smallest specimens I found were about 40 mm. long. Head small, pale yellow. Body white, with slight transverse folds in skin posteriorly on each segment. A narrow yellow ridge on first segment, crossing it transversely in centre. The following segments have each a narrow black transverse band anteriorly, which on second and third segments has a shorter narrow black band behind it. The other segments have a small black cuneiform spot subdorsally extending backwards from the transverse bands. Laterally there is a narrow black line, interrupted on each segment anteriorly by the white ground-colour. This line sends up two small black shoots, one centrally and the other posteriorly. In some specimens the lateral black markings are wanting. Horn black, with a white ring near tip.

"When mature the larva changes completely in colour and markings. At longest from 110 to 121 mm. Head and first and last segments pale grey ; head with a small black spot on either side of the mouth. The body is dorsally grey, with four longitudinal bands of light grey, edged with a narrow white line followed by a dark grey or black line, which shades into ground-colour. In some specimens the inner two bands are interrupted, forming on each segment an oblong

spot. Sides grey ; on each segment a large white spot edged with black. These spots are very irregular in shape, and on segments 6 to 10 form a large anterior and a smaller posterior spot, or divide into three or four small spots. The first segment has at its anterior edge a small black subdorsal spot, and on either side a black line which extends to and joins the black edging of the white lateral patch ; sometimes this segment is simply bordered anteriorly with black. Each segment has posteriorly four ringlets, which give the bands an irregular appearance. Horn filiform, 25 to 30 mm. long, black with two white rings, one at base and the other near tip ; this horn, owing to its thinness and length, sometimes curls up at the end like a corkscrew.

"Underneath the colour is pale brown, almost white in some instances, having on each segment a few black marks. The anal segment is pale grey, partly edged with brown ; two slight excrescences on lappets. Prolegs yellowish, with two black spots exteriorly ; abdominal legs grey, with a broad black stripe at the base.

"The larva forms a coarse cocoon on surface of ground, and changes to pupa in from 10 to 14 days. Pupa about 60 mm. long, rather slight, and bearing a strong resemblance to the pupae of *Erinnyis*, but is lighter in colour, with the dashes of dark brown more conspicuous. The wing-cases especially are similar, but the markings on thorax and head are fewer in number, the pupa resembling in this respect more that of *Pseudosphinx tetrio*, which has also the same shape.—Food-plant : *Plumeria*."

Hab. Central America : Mexico to Panama, probably farther south on the western side of South America.

In the Tring Museum 14 ♂♂, 11 ♀♀ from : Vera Cruz, Mexico ; Yucatan ; Rosery Mines, Spanish Honduras ; Costa Rica.

c. I. rimosa papayae.

Anceryx scyron, Walker (*non* Cramer, 1780), *l.c.* viii. p. 225. n. 5 (1856) (partim ; Venezuela).

(?) *Anceryx silenus*, Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 77 (1868) (*nom. nud.*).

**Anceryx papayae* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 126. n. 10 (1875) (Cayenne ;—coll. Charles Oberthür).

**Isognathus laura* Butler, *Trans. Zool. Soc. Lond.* ix. p. 601. n. 2 (1877) (Venezuela ;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 698. n. 1 (1892).

Isognathus papayae, Butler, *l.c.* p. 630 (1877) ; Kirby, *l.c.* n. 14 (1892) ; Schaus, *Ent. News* ix p. 136 (1898) (= *laura*).

Pseudosphinx scyron, Burmeister (*non* Cramer, 1780), *Descr. Rép. Argent.* v. p. 327. n. 2 (1878) (partim).

♂ ♀. On the whole much smaller than the West Indian and Central American races.——Forewing very strongly marked in brown and white in both sexes.—— Hindwing below with second discal line very prominent at costal margin (first line generally absent) ; border of hindwing above a little narrower than in *inclitus*.

Hab. Venezuela ; Guiana ; probably occurring farther south.

In the Tring Museum 14 ♂♂, 11 ♀♀ from : Merida, Aroa, and Caripa, Venezuela.

290. Isognathus excelsior.

**Anceryx excelsior* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 127. n. 12 (1875) (hab. ? ;—coll. Charles Oberthür).

Isognathus excelsior, Butler, *Trans. Zool. Soc. Lond.* ix. p. 630 (1877) ; Kirby, *Cat. Lep. Het.* i. p 698. n. 16 (1892).

♂ ♀. Resembling *I. rimosa inclitus*, but distinguished from this and all other

Isognathus by the underside of the abdomen being purely white, with conspicuous black dots.

Hab. Brazil.

In the Tring Museum from "Brazil."

In the Bern Museum and the British Museum from Para (Dr. Goeldi).

291. Isognathus caricae.

Sphinx caricae Linné, *Mus. Lud. Ulr.* p. 350 (1764); Clerck, *Icon. Ins.* ii. t. 47. f. 1 (1764); Houtt., *Naturl. Hist.* i. 11. p. 432. n. 9 (1767); Linné, *Syst. Nat.* ed. xii. p. 800. n. 11 (1767); Fabr., *Syst. Ent.* p. 547. n. 35 (1775); Cram., *Pap. Exot.* i. p. 155 (1776) (= *cacus*); Goeze, *Ent. Beytr.* iii. 2. p. 161. n. 11 (1780) (synon. partim); Fabr., *Spec. Ins.* ii. p. 153. n. 58 (1781); Stoll, *Essai Ordre Syst.*, in Cram., *Pap. Exot.* iv. p. 16 (1782) (= *cacus*); Fabr., *Mant. Ins.* ii. p. 98. n. 64 (1787); Gmel., *Syst. Nat.* i. 5. p. 2379. n. 11 (1790); Fabr., *Ent. Syst.* iii. 1. p. 378. n. 67 (1793); Thunb., *Mus. Nat. Ups.* xxiii. p. 9 (1804).

Sphinx cacus Cramer, *Pap. Exot.* i. p. 73. t. 46. f. E (1775); Fabr., *Spec. Ins* ii. p. 143. n. 15 (1781); id., *Mant. Ins.* ii. p. 94. n. 17 (1787) (no name); Gmel., *Syst. Nat.* i. 5. p. 2375. n. 59 (1790); Fabr., *Ent. Syst.* iii. 1. p. 361. n. 18 (1793); Ménétr., *Enum. Corp Anim. Mus. Petr., Lep.* ii. p. 90. n. 1496 (1857) (Surinam).

Erinnyis caricae, Hübner, *Verz. bek. Schm.* p. 139. n. 1493 (1822).

Dilophonota cacus, Burmeister, *Sphing. Brasil.* p. 70 (1856).

Dilophonota caricae, id., *l.c.* p. 70 (1856) (*cacus?*).

Anceryx caricae (1), Walker, *List Lep. Ins. B. M.* viii. p. 228. n. 11 (1856); Boisd., *Spec. Gén. Lép. Hét.* i. p. 123. n. 5 (1875) (Cayenne; larva).

Tatoglossum caricae, Butler, *Trans. Zool. Soc. Lond.* ix. p. 599 (1877); Auriv., *Kongl. Sv. Ak. Handl.* xix. 5. p. 132. n. 168 (1882) (recens. crit.); Kirby, *Cat. Lep. Het.* i. p. 699. n. 1 (1892) (Surinam); Bönningh., *Iris* xii. p. 118. n. 25 (1899) (Rio de Jan.).

♂♀. A stout species, reminding one of *Acherontia*, to which it is, however, not at all related, except in so far as both are *Sphingidae*. Bands of abdomen conspicuous; transverse lines on the black upperside of the forewing distinct, the pattern more ancestral than that of the other species. Veins of hindwing streaked with black in outer half of wing. Underside of the typical *Isognathus* pattern.

Early stages not known.

Hab. South America: Venezuela to Rio de Janeiro; commoner in the North than in the South.

In the Tring Museum 10 ♂♂, 19 ♀♀ from: British Guiana; Suapure, Caura R., Venezuela, end of vi. vii. viii. ix. (S. Klages); Merida.

XC. ERINNYIS.—Typus: *ello*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim; type: *ocellata*).

Erinnyis Hübner, *Verz. bek. Schm.* p. 139 (1822) (partim; type: *ello*).

Dilophonota Burmeister, *Sphing. Bras.* p. 68 (1856) (type: *ello*).

Anceryx Walker, *List Lep. Ins. B. M.* viii. p. 222 (1856) (partim; type: *pinastri*).

♂♀. Genal process triangular, obtuse, nearly as long as the pilifer. Palpus truncate, projecting, the two together rounded in dorsal view, apical surface oblique, on a level with frons. Antenna setiform, very faintly incrassate distally in ♀; end-segment long, filiform (excepting base), about as long as 6 to 8 previous segments, rough-scaled. Scaling of occiput elevate, divided into a double crest (in well preserved individuals). Mesonotum with double crest, which is highest in front. Abdominal tergites with one row of apical spines, these very strong, conical, those of posterior tergites separate; the spines of the sternites less strong,

more numerous ; ♂ with three-cornered or three-tufted tail, side-tufts not developed in ♀ ; seventh sternite of ♀ long trapeziform, without spines. Merum of midcoxa with faint indication of an angle. Legs slender, smooth-scaled : midtarsus with rudimentary comb, no comb to hindtarsus ; spurs very unequal, long terminal one of hindtibia rather longer than the second tarsal segment ; last segment of hindtarsus (claw excepted) shorter than fourth. Distal margin of forewing regularly dentate, subbasal patch of modified scales of underside rounded-truncate at end, not acuminate ; R^2 of hindwing central, D^3 longer than D^1, lower angle of cell acute.

♂. Tenth abdominal segment of the same type as in *Pseudosphinx*, *Perigonia*, *Madoryx*, etc., both the tergite and sternite divided into two lobes ; the tergal lobes flattened, obtuse, hairy ; the sternal ones long, conical, acute, strongly chitinised, curved at end, contiguous with the tergite, and a little longer than this. Clasper elongate, tongue-shaped, narrowing distally ; a patch of many erect, small, lanceolate friction-scales; harpe (Pl. XLV. f. 20—24) produced into an obtuse process, which is more or less dilated at end, here sometimes sinuate, its surface smooth. Penis-sheath (Pl. LIII. f. 8. 9) with a brush of spines inside, which break off easily (being present as a rule only in fresh specimens, which have apparently not copulated) ; a series of teeth at the right and left edges of the sheath.

♀. Eighth tergite weak, membranaceous for the greater part ; vaginal plate with the lateral distal edge more or less free, ridge-like ; distal part scaled, mesially triangular ; orifice proximal, pear-shaped, situated in a large cavity formed by a smooth proximal membrane.

Larva cylindrical, somewhat flattened, head strongly slanting in side-view ; horn short ; thorax with a black mesial patch anteriorly on third segment, generally marked with red and white; dorsal surface darker in colour than sides and ventral surface, the two colours often separated by a longitudinal pale line.— Food-plants : *Carica ; Morrenia ; Jatropha* (?).

Chrysalis glossy, polished, pale brown, wings striped with black, abdomen with short transverse black dashes.

Hab. Tropical and subtropical America ; some species wandering northward well into the Nearctic region, one as far as Canada.

The species are not very difficult to distinguish if one keeps in mind that the sexes of several species are remarkably different, the ♂♂ of these being very much darker on the forewing than the respective ♀♀. Owing to this sexual dichromatism, to individual variability, and to the carelessness of some authors, the synonymy of some species is much involved. But the way was cleared for us, thanks to Mr. W. Schaus, who corrected a number of errors committed by Grote and others. We fear we have not put into the right place some of the species enumerated by Herr von Bönninghausen from Rio de Janeiro under Grotean and Boisduvalian names.

Key to the species :

a.	Hindwing yellow	292. *E. alope.*
	Hindwing cinnamon-rufous or brownish black or greyish brown	*b.*
b.	Abdomen with sharply marked black belts . .	*c.*
	Abdomen without sharply marked black belts .	*d.*
c.	Forewing black for the greater part . .	293. *E. lassauxi.*
	Forewing grey, with (♂) or without (♀) a mesial streak from base to apex . .	294. *E. ello.*

d. Forewing grey, in ♂ with a mesial black streak, blackish border of hindwing replaced by vein-streaks in front . . . . *e.*

Forewing grey, hindwing not cinnamon-rufous but greyish-brown, without a marginal band . . . . . 300. *E. guttularis.*

Forewing for the greater part black, or the marginal border of the hindwing complete . *f.*

e. Length of forewing 38 mm. or more . . 295. *E. yucatana.*

Length of forewing 35 mm. or less . . 298. *E. obscura.*

f. ♂♂ . . . . . *g.*

♀♀ . . . . . *h.*

g. No distinct black dots on underside of abdomen ; mesothorax clay-colour, except in front, without whitish grey lateral vitta ; border of hindwing complete . . 297. *E. crameri.*

Abdomen below with black dots ; thorax streaked, not obviously paler behind ; black area of forewing excised behind between M^1 and M^2; marginal border of hindwing complete . . . . . 296. *E. oenotrus.*

Thorax with conspicuous whitish grey lateral vitta ; a black basi-apical streak visible within the black area of the forewing, corresponding to the streak of *obscura* ; marginal border of hindwing replaced by thin vein-streaks in upper half ; a small species . . . . . 299. *E. domingonis.*

h. Forewing grey for the greater part . . 296. *E. oenotrus.*

Forewing black for the greater part, border of hindwing complete . . . . 297. *E. crameri.*

Forewing black for the greater part, border of hindwing incomplete in upper half, not sharply defined ; a small species . . 299. *E. domingonis.*

292. **Erinnyis alope.**

Merian, *Metam. Surin. Ins.* t. 62 (1719) (partim ; *eruca*).

Sphinx alope Drury, *Illustr. Ex. Ins.* i. p. 58. t. 27. f. 1 & Index (1773) (Jamaica) ; Stoll, in Cram., *Pap. Exot.* iv. p. 23. t. 301. f. G (1782) ; Fabr., *Mant. Ins.* ii. p. 94. n. 19 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2375. n. 62 (1790); Fabr., *Ent. Syst.* iii. 1. p. 362. n. 20 (1793) ; Drury, ed. Westw., *Illustr. Ex. Ins.* i. p. 52. t. 27. f. 1 (1837) ; Ménétr., *Enum. Corp. Anim. Mus. Petr.* ii. *Suppl.* p. 90. n. 1495 (1857) (Brasilia ; Jamaica).

Sphinx flavicans Goeze, *Ent. Beytr.* iii. 2. p. 216. n. 44 (1780) (Jamaica).

Erinnyis alope, Hübner, *Verz. bek. Schm.* p. 139. n. 1492 (1822) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 75 (1865) (Cuba) ; id. & Rob., *ibid.* p. 167. n. 168 (1865).

Sphinx fasciata Swainson, *Zool. Illustr.* iii. t. 150. f. 2 (1823) (Jamaica ?).

Dilophonota alope, Burmeister, *Sphing. Bras.* p. 69 (1856) ; Grote, *l.c.* vi. p. 329 (1867) (Cuba) ; id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) (Cuba) ; Burm., *Descr. Rép. Argent.* v. p. 331 (1878) (Corrientes ; Paraguay) ; id., *l.c. Atlas* p. 32 (1879) (larva noticed) ; Gundl., *Contr. Ent. Cubana* p. 218 (1882) ; Schaus, *Ent. News* vi. p. 144 (1895) (synon.); Bönningh., *Iris* xii. p. 122. n. 38 (1899) (Rio de Jan.).

Anceryx alope, Walker, *List Lep. Ins. B. M.* viii. p. 225. n. 6 (1856); Lucas, in Sagra, *Hist. Cuba* vii. p. 298 (1856); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 177. n. 76 (1859); id., in Morris, *Syn. Lep. N. Am.* p. 202. n. 4 (1862); Herr.-Sch., *Corresp. Blatt* p. 60 (1865) (Cuba); Boisd., *Spec. Gén. Lép. Hét.* i. p. 121. n. 2 (1875); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 346 (1876) (Surinam); Butl., *Trans. Zool. Soc. Lond.* ix. p. 600. n. 1 (1877) (Jamaica); Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 18. n. 1 (1881); Kirby, *Cat. Lep. Het.* i. p. 699. n. 1 (1892); Druce, *l.c. Suppl.* p. 312 (1896) (*fasciata* distinct).

Anceryx fasciata, Butler, *Trans. Zool. Soc. Lond.* ix. p. 600. n. 2 (1877) (Haiti; Jamaica); id., *Proc. Zool. Soc. Lond.* p. 483. n. 57 (1878) (Jamaica); Kirby, *l.c.* n. 2 (1892).

Pseudosphinx scyron, Burmeister (*non* Cramer, 1780), *Descr. Rép. Argent.* v. p. 327. n. 2 (1878) (sub syn.).

**Anceryx edwardsi* Butler, *Papilio* i. p. 105 (1881) (Florida); Grote, *Canad. Ent.* xviii. p. 136. n. 97 (1886); Edw., *Ent. Amer.* iii. p. 164 (1887) (larva, pupa); Smith, *Trans. Amer. Ent. Soc.* xv. p. 159. t. 8. f. 1. 2. 3 (genit.) (1888) (Florida); Edw., *Bull. U. St. N. Mus.* xxxv. p. 48 (1889) (liter. rel. to metam.); Kirby, *l.c.* n. 3 (1892).

♂ ♀. The characters by which some authors thought to be able to distinguish *alope*, *fasciata* and *edwardsi*, are partly individual, partly sexual; *fasciata* and *edwardsi* are synonyms of *alope*. The species resembles *crameri* in the dark-coloured forewing, and *Isognathus* in the yellow colour of the hindwing.

♂. Slender processes of tenth sternite longer than the tergal lobes. Harpe dilated at end, rather short (Pl. XLV. f. 21).

Larva brown above, green below, the two colours separated by a nearly black line, which is more or less interrupted; thorax with a large black mesial patch anteriorly on third segment, including a red ring; horn very short.—Food-plant: *Jatropha* (Merian); *Carica*.

Chrysalis darker than that of *ello*.

Hab. Tropical and Subtropical America: West Indies, Bahamas, Florida, southward to Southern Brazil and Northern Argentina.

In the Tring Museum 1 larva, 80-odd specimens from: Florida; Nassau; Jamaica; St. Vincent; various places from Mexico to Southern Brazil and Matto Grosso. Not seen from the Bolivian Andes.

293. Erinnyis lassauxi.

**Anceryx lassauxi* Boisduval, *Bull. Soc. Ent. France* p. 157. n. 2 (1859) (Buenos Ayres;—coll. Charles Oberthür); id., *Spec. Gén. Lép. Hét.* i. p. 129. n. 14 (1875) (Bras. sept.)

Dilophonota lassauxi, Butler, *l.c.* ix. p. 604. n. 10 (1877); Kirby, *Cat. Lep. Het.* i. p. 697. n. 9 (1892); Rothsch., Nov. Zool. i. p. 95 (1894).

Dilophonota lassauxi (!), Bönninghausen, *Iris* xii. p. 122. n. 39 (1899) (Rio de Jan.).

♂ ♀. The hindwing is deeper ferruginous-red in this species than in the others, and the red colour is often entirely or partly replaced by brownish black. The crest of the mesothorax is nearly as high as in *alope*. The abdominal tergites are black, except narrow, dorsally interrupted, sharply defined, grey apical belts. The dark forewing resembles that of *crameri*; there is a large, triangular, costal, apical grey patch.

♂. Lobes of tenth tergite broader and shorter than in the other species somewhat obtusely acuminate, the processes not essentially longer than the tergite, curved downward and very little outward at end. Process of harpe with the upper edge rounded-dilated at end, the dilated part elliptic.

Larva (acc. to Burmeister, see *cercyon*, below), very much like that of *ello* as described by Burmeister.*—Food-plant: *Morrenia*.

* See *ello*.

Chrysalis like that of *ello* and *alope*.

Hab. Tropical and Subtropical America: West Indies, Texas to Argentina.

The species varies especially in two directions: in the amount of ferruginous-red on the hindwing, and in size. We recognise four forms, of which the first three are connected by intergradations, while the fourth seems to be pretty constant and may eventually prove to be specifically distinct. The first and fourth occur on the mainland only; the second and third also on the Antilles. The larger individuals have the ferruginous-red area of the hindwing reduced, the smaller ones have it more or less extended to normal size (as in other species), but there is no sharp limit between larger and smaller specimens, nor between such with reduced and extended ferruginous-red area.

If any one has an occasion of studying the life-history of this species, he should pay special attention to the variation, and state explicitly to which special form or forms his observations refer.

a'. E. lassauxi f. *lassauxi*.

**Anceryx lassauxi* Boisduval, *l.c.*

♂ ♀. Hindwing without ferruginous-red area above, or this colour vestigial.

Hab. Argentina northward to Venezuela; most likely also in Central America.

In the Tring Museum 3 ♂♂, 5 ♀♀ from: Aroa, Merida, and the Orinoco, Venezuela; Buenos Aires.

b'. E. lassauxi f. *omphaleae*.

**Anceryx omphaleae* Boisduval, *Cons. Lép. Guatemala* p. 72 (1870) (Nicaragua;—coll. Charles Oberthür); Kirby, *l.c.* n. 5 (1892) (partim).
Anceryx piperis, Schaufuss (*non* Grote & Rob., 1868), *Nunq. Otios.* i. p. 17 (1870) (Venezuela).
Dilophonota cerreyon Burmeister, *Descr. Rép. Argent.* v. p. 332 (1878) (Buenos Aires; larva).
Dilophonota piperis, Butler, *l.c.* ix. p. 603. n. 2 (1877).
Dilophonota picta, Kirby, *l.c.* n. 11 (1892) (sub syn.)
Dilophonota obscura ab. *omphaleae*, Rothschild, *l.c.*

♂ ♀. Hindwing with a cinnamon-rufous patch of varying size.

Hab. South and Central America and the West Indies.

In the Tring Museum 15 ♂♂, 11 ♀♀ from: Jamaica; Orizaba, Mexico, ii.–iv. (Schaus); Costa Rica (Underwood); Rio Dagua, Colombia (Rosenberg); Merida, Venezuela, iii. v. (Briceno); Aroa, Venezuela; La Paz, Bolivia; Argentina.

c'. E. lassauxi f. *merianae*.

Anceryx spec., Herr.-Sch., *Corresp. Blatt.* p. 60 (1865) (Cuba).
Erimyis merianae Grote, *Proc. Ent. Soc. Philad.* v. p. 75. t. 2. f. 2 (1865) (Cuba); id. & Rob., *ibid.* p. 168. n. 109 (1865) (Cuba).
Dilophonota merianae, Grote, *l.c.* vi. p. 329 (1867); Butl., *l.c.* ix. p. 603. n. 3 (1877); Grote, *Bull. Buffalo Soc. N. Sc.* iii. p. 225. n. 70 (1877) (Texas); Gundl., *Contr. Ent. Cubana* p. 219 (1882); Grote, *Canad. Ent.* xviii. p. 136. n. 94 (1886) (W. Ind.; Mex.; Texas); Smith, *Trans. Amer. Ent. Soc.* xv. p. 158 (1882) (Texas); Kirby, *Cat. Lep. Het.* i. p. 697. n. 7 (1892); Schaus, *Ent. News* vi. p. 144 (1895) (synon.); Druce, *l.c. Suppl.* p. 313. n. 3 (a) (1896) (Mexico; Nicaragua; Costa Rica; Panama; Ecuador).
Anceryx merianae, Boisduval, *l.c.* p. 128. n. 13 (1875) (= *omphaleae*); Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico).
**Anceryx jamiphae* Boisduval, *l.c.* p. 131. n. 17 (1875) (Haiti;—coll. Charles Oberthür); Kirby, *l.c.* n. 6 (1892).
Dilophonota lassauxi ab. *merianae*, Rothschild, *l.c.* (1894).
Dilophonota obscura ab. *jamiphae*, Rothschild, *l.c.*

♂♀. Blackish brown border of hindwing narrow. Abdomen with black dots below as in the two preceding forms.

Hab. West Indies and Florida, Central America.

In the Tring Museum 2 ♂♂, 1 ♀ from : Cuba ; Haiti.

d'. E. lassauxi f. *impunctata* nov.

Like *merianae* ; rather smaller on an average ; the abdomen without black dots on the underside, which is rather paler ; the brownish black border of the hindwing well defined.

Hab. Venezuela southward to Tucuman.

In the Tring Museum 7 ♂♂, 5 ♀♀ from : Aroa (*type*) and Merida, Venezuela ; Reyes, Bolivia, vii. '95 (Stuart) ; Tucuman.

294. Erinnyis ello.

Merian, *Metam. Ins. Surin.* t. 64 (1719) (*eruca*).

Sphinx ello Linné, *Syst. Nat.* ed. x. p. 491. n. 11 (1758) ; id., *Mus. Lud. Ulr.* p. 351 (1764) ; Houtt., *Naturl. Hist.* i. 11. p. 437. n. 11 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 800. n. 13 (1767) ; Drury, *Illustr. Ex. Ins.* p. 59. t. 27. f. 3 (1771) ; id., *l.c.* Index (1773) ; Müll., *Naturs.* v. 1. p. 639. n. 13 (1774) ; Fabr., *Syst. Ent.* p. 538. n. 7 (1775) ; Stoll, in Cram., *Pap. Exot.* iv. p. 22. t. 301. f. D (1780) ; Goeze, *Ent. Beytr.* iii. 2. p. 163. n. 13 (1780) ; Fabr., *Spec. Ins.* ii. p. 143. n. 17 (1781) ; id., *Mant. Ins.* ii. p. 94. n. 20 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2375. n. 13 (1790) ; Fabr., in Illig., *Mag. Ent.* p. 88. n. 43 (1807) ; Swains., *Zool. Illustr.* i. t. 81 (1822) ; Drury, ed. Westw., *Illustr. Ex. Ins.* i. p. 54. t. 27. f. 3 (1837) ; Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 297. n. 14 (1839) : Ménétr., *Enum. Corp. Anim. Mus. Petr.* ii. *Suppl.* p. 90. n. 1493 (1857) ; Morris, *Cat. Lep. N. Am.* p. 18 (1860) ; Baer, *Bull. Soc. Ent. France* p. 173 (1878) (larva).

Erinnyis ello, Hübner, *Verz. bek. Schm.* p. 139. n. 1489 (1822) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 73 (1865) ; id. & Rob., *l.c.* p. 167. n. 107 (1865) (Cuba) ; Auriv., *Kongl. Sc. Vet. Ak. Handl.* xix. 5. p. 133. n. 169 (1882) (*recens. Lep. Mus. Lud. Ulr.*).

Dilophonota ello, Burmeister, *Sphing. Bras.* p. 69 (1856) ; Grote, *l.c.* vi. p. 329 (1867) ; id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) ; id., *Bull. Buffalo Soc. N. Sc.* i. p. 27 (1874) ; id., *l.c.* ii. p 228. n. 67 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 603. n. (1877) ; Grote, *l.c.* iii. p. 225. n. 69 (1877) (New York ; Penn. ; S. States) ; Butl., *Proc. Zool. Soc. Lond.* p. 483. n. 58 (1878) (Jamaica) ; Burm., *Descr. Rép. Argent.* v. p. 331 (1878) ; id., *l.c. Atlas* p. 32. t. 12. f. 2 (*l.*). 7 (*p.*) (1879) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 19. n. 1 (1881) ; Gundl., *Contr. Ent. Cubana* p. 222 (1882) (larva) ; Fern., *Sphing. N. Engl.* p. 51. n. 22 (1886) ; Holl., *Canad. Ent.* xviii. p. 103 (1886) (larva) ; Grote, *Canad. Ent.* xviii. p. 136. n. 92 (1886) (West Indies northward) ; id., *Hawk Moths N. Am.* p. 46 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 156. t. 8. f. 6 (genit.) (1888) (Florida southward ; westward to Calif. ; northward occas. to N.Y. & Mass.) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 48 (1889) (lit. rel. to metam.) ; Kirby, *Cat. Lep. Het.* i. p. 696. n. 1 (1892) ; Rothsch., Nov. Zool. i. p. 95 (1894) ; Moffat, *Canad. Ent.* xxvii. p. 172 (1895) (London, O.) ; Druce, *l.c. Suppl.* p. 313 (1896) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 296. t. 4. f. 1. 2 (1897) (N. York) ; Rowl., *Ent. News* x. p. 11 (1899) (Missouri, Oct. 10) ; Kaye, *Trans. Ent. Soc. Lond.* p. 139 (1901) (Trinidad).

Aweryx ello, Walker, *List Lep. Ins. B. M.* viii. p. 224. n. 4 (1856) ; Clem., *Journ. Ac. N. Sci. Philad.* iv. p. 175. n. 73 (1859) ; id., in Morris, *Syn. Lep. N. Am.* p. 200. n. 1 (1862) ; Herr.-Sch., *Corresp. Bl.* p. 59 (1865) (Cuba) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 120. n. 1 (1875) (larva) ; Möschl., *Verh. Zool. Bot. Ges. Wien.* xxvi. p. 346 (1876) (Surinam) ; Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico) ; id., *Zeitschr. ges. Naturw.* liii. p. 169 (1879) (larva noticed ; Cuba) ; Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O., one ♂) ; Edw., *Ent. Amer.* iii. p. 165 (1887) (larva) ; Snell., *Tijdschr. Ent.* xxx. p. 33 (1887) (Curaçao).

Dilophonota ello A., Bönninghausen, *Iris* xii. p. 121. n. 32 (1899) (Rio de Jan.).

Dilophonota ello B., id., *l.c.* n. 33 (1899) (Rio de Jan.).

(?) *Dilophonota spec.*, Peters, *Illustr. Zeitschr. Ent.* iv. t. 4 (1899) (larva).

♂♀. Perhaps the commonest Sphingid of tropical America. The ♂ with a black mesial band from base to apex of the grey forewing varying in width, the ♀ without this band, or only traces of it indicated. Not easily confounded with

any other species on account of the prominently banded abdomen ; it is one of the very few species named by Linné which has received only one name. Size variable ; our smallest specimen (from Jamaica) little more than half the size of the largest.

♂. Tenth tergite and sternite of the same length, the tips of the slender sternal processes recurved, not projecting beyond the obtuse ends of the tergal lobes. Harpe long, reaching to middle of clasper, dilated and strongly compressed distally, apical part so twisted that its flat side is almost horizontal (or vertical upon the plane of the clasper). Penis-sheath similar to that of *crameri*.

Larva (according to Burmeister, *l.c.*), young : green with an orange dorso-lateral band ; adult : bluish above, greenish at the sides and below, the two colours separated by a pale band running from head to horn ; thorax with a black mesial patch partly encircled with white and red.

Pupa marked with black stripes.

Mr. W. Schaus found another larva at Rinconado, in Mexico, from which he bred specimens identical with *ello* except in being rather small. We have dissected one of the ♂♂, and cannot find any difference from the sexual armature of a series of ordinary large *ello*. We may here have a case of that dichromatism in the larva which is so abundantly found among the *Sphingidae*, and of which *Spheeodina abbotti* is such a striking illustration. Here is Mr. Schaus's description : A little smaller than *ello*. Head and first segment pink. Prolegs pinkish, circled with black. Abdominal legs flesh-colour, with black and red circles. Anal claspers and lappets brownish, dotted with white. Body purplish grey ; anteriorly on each segment a small black subdorsal spot. The large eye-spot between second and third segments is surrounded with brown, and has posteriorly a white transverse spot ; dorsally towards the sides and anteriorly there is on segments 4 to 11 a large black patch, all connected together by fine black lines extending from the head to the horn. Stigmata white. Laterally below the black patches there is a brownish band of mottled red and grey, and anteriorly on each segment two white spots, one above the other. Horn short, conical, reddish, black at the base. Under surface flesh-colour, with numerous small black lines.

Gundlach, *l.c.*, describes also two forms of the caterpillar.

Herr von Bönninghausen, *l.c.*, maintains that there are two species confounded under *ello* ; the one, he says, has in *both* sexes a black streak on the forewing from the base to the apex. All the ♀♀ which we have examined were without such a streak. We have not seen Bönninghausen's supposed streaked ♀, but we have no doubt that Bönninghausen's statement is based on a mistake.

Hab. Tropical and Subtropical America, as a wanderer as far north as Canada.

Very common.

In the Tring Museum 300-odd specimens.

295. **Erinnyis yucatana.**

**Isognathus yucatana* Druce, *Ann. Mag. N. H.* (6). ii. p. 238 (1888) (Yucatan).

Isognathus (?) *yucatanus*, Kirby, *Cat. Lep. Het.* i. p. 698. n. 17 (1892).

Isognathus yucatanus Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 312. n. 3. t. 65. f. 1 (1896) (Mexico ; Yucatan).

♂♀. This is an *Erinnyis*, not an *Isognathus*. The most robust species of the genus, resembling in this respect some *Isognathus*. The transverse zigzag lines of the whitish grey forewing are sometimes rather distinct. The sexes differ in a similar way as in *ello* and *obscura*. The longitudinal basi-apical streak of the

forewing is more or less interrupted, widened on disc and zigzag; the oblique streak before the hinder angle, so distinct in *obscura*, is vestigial here. The blackish border of the hindwing is not sharply defined and fades often away in front. The external series of spines on the first segment of the foretarsus is doubled, at least at base.

♂. Processes of tenth sternite longer than the tergite. Harpe short and stout (Pl. XLV. f. 24). Armature of penis-sheath (Pl. LIII. f. 8) different from that of the other species: the dentate part of the right-side edge very short, the row reduced to a few teeth; the left-side row also short, consisting of about five teeth; the apical process rather prominent, with a short but obvious carina before end and a tooth at the tip.

Hab. Mexico: Yucatan; Orizaba; Jalapa; Costa Rica.

In the Tring Museum 5 ♂♂, 5 ♀♀ from: Jalapa, ii.; and Orizaba, ii. iv. (Schaus); San José, Costa Rica, iii. (Underwood).

Occurring most likely farther south.

296. **Erinnyis oenotrus** (Pl. X. f. 7, ♂).

Sphinx oenotrus Stoll, in Cramer, *Pap. Exot.* iv. p. 22. t. 301. f. c (1780) (Surinam); Ménétr., *Enum. Corp. Anim. Mus. Petr.* ii. *Suppl.* p. 90. n. 1494 (1857).

Sphinx penaeus Fabricius, *Mant. Ins.* ii. p. 93. n. 14 (1787) (Amer. mer.); Gmel., *Syst. Nat.* i. 5. p. 2374. n. 56 (1790); Fabr., *Ent. Syst.* iii. 1. p. 360. n. 15 (1793).

Erinnyis oenotrus, Hübner, *Verz. bek. Schm.* p. 139. n. 1490 (1822).

Dilophonota oenotrus, Burmeister, *Sphing. Brasil.* p. 70 (1856); Schaus, *Ent. News* ix. p. 136 (1898) (= *melancholica* = *piperis*; = *cinerosa* = *juniphae* ex err.); Bönningh., *Iris* xii. p. 122 (1899) (partim ?).

Sphinx picta Sepp, *Surin. Vlind.* ii. t. 96 (1848) (♀, *fig. mala*).

Anceryx oenotrus, Walker, *List Lep. Ins. B. M.* viii. p. 227. n. 9 (1856) (partim); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 177. n. 78 (1859); id.. in Morris, *Syn. Lep. N. Am.* p. 202. n. 6 (1862); Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico); Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 332 (1882) (Surinam).

Zonilia penaeus, Walker, *l.c.* p. 193. n. 2 (1856) (sub syn.).

Erinnyis melancholica Grote, *Proc. Ent. Soc. Philad.* v. p. 77. t. 2. f. 4 (♂) (1865) (Cuba); id. & Rob., *ibid.* v. p. 168. n. 111 (1865).

Dilophonota melancholica Grote, *l.c.* vi. p. 329 (1867) (Cuba); id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) (Cuba); id., *Canad. Ent.* xviii. p. 136. n. 93 (1886) (West Indies northward); Smith, *Trans. Amer. Ent. Soc.* xv. p. 160 (1888).

Anceryx piperis Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 77 (1868) (♀; = *cinerosa*;—Mus. Paris); Boisd., *Spec. Gén. Lép. Hét.* i. p. 132. n. 19 (1875) (Brazil).

Dilophonota aenotrus (!), Butler, *Proc. Zool. Soc. Lond.* p 484. n. 59 (1878) (Jamaica); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 19. n. 3 (1881); id., *l.c. Suppl.* p. 313 (1896).

Dilophonota hippothoon Burmeister, *Descr. Rép. Argent.* v. p. 333 (1878); id., *l.c. Atlas* p. 29. t. 10. f. 5 (♀) (1879).

Dilophonota obscura ?, *melancholica*, Gundlach, *Contr. Ent. Cubana* p. 220 (1882) (syn. partim).

Dilophonota sthena, id., *l.c.* p. 221 (1882) (sub syn.).

Dilophonota picta, Kirby, *l.c.* n. 11 (1892).

Dilophonota piperis, Bönninghausen, *l.c.* p. 121. n. 34 (1899) (Rio de Jan.).

♂♀. The sexes are dissimilar, the ♀ being greyish white on the forewing, with black patches, while the ♂ is blackish brown marked with grey. Abdomen below with black dots. Underside of palpus, breast, and abdomen paler than in *crameri*. Harpe see Pl. XLV. f. 20.

Larva (see Burmeister, *l.c.*, *hippothoon*) greenish yellow, with a pale band from head to horn.—Food plant: *Morrenia*.

Chrysalis pale yellow, striped with black on wing-cases and breast, abdominal segments with black transverse dashes.

Hab. Tropical and Subtropical America, as far north as Texas and Florida ; West Indies.

A common species.

In the Tring Museum 80-odd ♂♂, 30 ♀♀ from : Cuba; Jamaica ; various localities from Mexico to Argentina and Southern Brazil.

The description of *penaeus*, *l.c.*, applies better to the ♀ of this species than to any other Sphingid ; the white dot on the forewing mentioned by Fabricius, is, however, seldom distinct in the ♀.

As pointed out by Schaus, *l.c.*, the true *oenotrus* is quite distinct from the species confounded with it by Grote and others, and named by Schaus *crameri*. Butler and Druce identified this *crameri* as *omphaleae* of Boisduval, but were wrong, *omphaleae* being a variety of *lassauxi*.

Sepp's figure of *picta* is doubtless a bad representation of the ♀ of *oenotrus*.

Boisduval's *piperis* is not the same as Schaufuss's *piperis*, this being a variety of *lassauxi*.

297. **Erinnyis crameri** (Pl. X. f. 5, ♂).

Sphinx oenotrus, *Anceryx oenotrus*, *Dilophonota oenotrus* auct. partim, *non* Cramer.

Anceryx oenotrus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 129. n. 15 (1875) (Cayenne; Antilles ; Brazil).

Erinnyis oenotrus, Grote (*non* Cramer, 1780), *Proc. Ent. Soc. Philad.* v. p. 76. t. 2. f. 3 (♀) (1865) ; id. & Rob., *l.c.* p. 168. n. 110 (1865) (syn. partim).

Dilophonota oenotrus, Grote, *l.c.* vi. p. 329 (1867) ; id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) ; Burm., *Descr. Rép. Argent.* v., *Atlas* p. 32. t. 12. f. 3 (*l.*) (1879) ; Gundl., *Contr. Ent. Cubana* p. 219 (1882) ; Bönningh., *Iris* xii. p. 122. n. 36 (1899) (partim).

Dilophonota omphaleae, Butler (*non* Boisduval, 1870), *Trans. Zool. Soc. Lond.* ix. p. 603. n. 4 (1877) (Mexico ; Haiti) ; id., *Proc. Zool Soc. Lond.* p. 484 n. 60 (1878) (Jamaica) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p 19. n. 2 (1881) (Mexico ; Nicaragua ; Chiriqui).

Dilophonota crameri Schaus, *Ent. News* ix. p. 136 (1898) (= *oenotrus* auct. partim).

♂♀. The sexes are less dissimilar in pattern than in *oenotrus*, from which *crameri* is easily distinguished by the absence of black dots from the underside of the abdomen, the pale mesothoracic tegulae, the pale posterior area of the forewing, and the more broken and clearer-defined border of the hindwing.

♂. Tenth abdominal sternite a little less curved than in *oenotrus*. Process of harpe a little longer and apically narrower. Dextro-lateral dentate edge of penis-sheath (Pl. LIII. f. 9) proximally less produced than in *oenotrus*.

Larva (according to Burmeister, *l.c.*) without longitudinal lateral stripe, very finely striated with longitudinal, short, black dashes ; back brown, sides and under-surface green ; first and third thoracic segments with red mesial patch, the latter including a black spot ; horn very small.

Chrysalis as in *ello*.

Hab. Tropical and subtropical America : West Indies ; Mexico southward to Paraguay.

In the Tring Museum 32 ♂♂, 31 ♀♀ from : Cuba ; Jamaica ; Mexico ; Costa Rica ; Colombia ; Venezuela ; British Guiana ; Trinidad ; Amazons (Bates) ; Paraguay.

298. **Erinnyis obscura** (Pl. VIII. f. 6, ♀ ; 7. 8. 9, ♂♂).

Sphinx obscura Fabricius, *Syst. Ent.* p. 538. n. 6 (1775) (America); Goeze, *Ent. Beytr.* iii. 2. p. 205. n. 7 (1780) ; Fabr., *Spec. Ins.* ii. p. 142 n. 14 (1781) ; id., *Mant. Ins.* ii. p. 94. n. 16 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2375. n. 58 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 361. n. 17 (1793) (Amer. insul. !).

Sphinx rustica, Schaller, *Naturf.* xxiii p. 50. t. 1. f. 11 (1788).
Clanis phalaris, Kirby, *Cat. Lep. Het.* i. p. 702. n. 1 (1892) (partim).

♂♀. A small species, the larger examples agreeing in size with the smallest *oenotrus*. The sexes are dissimilar, and have been treated as distinct species by several authors. The sexual difference in the forewing is nearly the same as in *ello*, the ♂ possessing a longitudinal mesial band and an oblique posterior distal streak, which are not present in the ♀, or are only vestigial in that sex; or the sexes are almost identical.

♂. Lobes of the tenth tergite pointed, shorter than the long and slender processes of the sternite. Process of harpe (Pl. XLV. f. 22) long, somewhat knife-shaped, obtuse or slightly spatulate, curved, notched or sinuate at end.

Early stages not known.

Hab. Tropical and subtropical America.

Two subspecies, perhaps four.

a. E. obscura conformis, subsp. nov.

♂♀. Sexes similar; ♂ without a longitudinal streak on the forewing, and having thorax as grey as the ♀. Distal margin of hindwing rather darker in upper half than in the ordinary form, and the postdiscal line of dots more distinct.

Hab. Galapagos Is.: Albemarle, end of March to May 1902 (Beck); *type*: top of crater, S.E. Albemarle, 27. iii. 1902.

In the Tring Museum 4 ♂♂, 4 ♀♀.

b. E. obscura obscura.

Sphinx obscura Fabricius, *l.c.*
Erinnyis stheno Hübner, *Samml. Ex. Schm.* iii. t. 37 (1824?) (Sta. Cruz).
Ancryx obscura, Walker, *List Lep. Ins. B. M.* viii. p. 226. n. 7 (1856) (partim); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 176. n. 74 (1859); id., in Morris, *Syn. Lep. N. Am.* p. 201. n. 2 (1862); Boisd., *Spec. Gén. Lép. Hét.* i. p. 132. n. 20 (1875) (Antilles); Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 332 (1882) (Surinam).
Ancryx stheno, Lucas, in Sagra, *Hist. Cuba* vii. p. 298 (1856); Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico).
Erinnyis pallida Grote, *Proc. Ent. Soc. Philad.* v. p. 78. t. 1. f. 6 (♀) (1865) (Cuba); id. & Rob., *ibid.* p. 168. n. 113 (1865).
Dilophonota pallida Grote, *l.c.* vi. p. 329 (1867) (Cuba); Grote, *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) (Cuba); Butl., *Trans. Zool. Soc. Lond.* ix. p. 604. n. 8 (1877) (= ? *gutturalis*); Gundl., *l.c.* p. 225 (1882).
Erinnyis cinerasa Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 168. n. 71 (1865) (*nom. indescr.*); Grote, *Ann. Lyc. N. York* viii. p. 201 (1867) (Cuba).
Dilophonota obscura, id., *Bull. Buffalo Soc. N. H.* i. p. 27 (1874) (Pennsylvania); id., *l.c.* ii. p. 228. n. 68 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 604. n. 7 (1877) (Mexico; Haiti); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 19. n. 4 (1881) (Mexico; Chiriqui); Grote, *l.c.* iii. p. 225. n. 71 (1877) (Pennsylvania; S. Carolina); id., *Canad. Ent.* xviii. p. 136. n. 96 (1886) (S. States); Smith, *Trans. Amer. Ent. Soc.* p. 157 (1888) (Pa?; Texas); Kirby, *Cat. Lep. Het.* i. p. 697. n 13 (1892); Rothsch., *Nov. Zool.* i. p. 75 (1894) (partim); Druce, *l.c. Suppl.* p. 313 (1896) (Mexico; Guatemala); Grant, *Canad. Ent.* xxx. p. 264 (1898) (Orillia, O., Sept. 20).
**Ancryx rhaebus* Boisduval, *Consid. Lép. Guatemala* p. 72 (1870) (Honduras; Mexico); id., *Spec. Gén. Lép. Hét.* i. p. 131. n. 18 (1875).
Dilophonota stheno, Gundlach, *l.c.* p. 221 (1882); Bönningh., *Iris* xii. p. 121. n. 35 (1889) (Rio de Jan.).
Dilophonota rhaebus, Druce, *l.c.* p. 19. n. 5 (1881) (partim).

♂♀. Sexes dissimilar, the ♂ having a darker thorax than the ♀, and possessing on the forewing a blackish streak which runs from the base towards the apex.

Hab. Tropical and Subtropical America, occasionally northward to Canada.

The specimens from the West Indies and the Continent belong apparently to three subspecies :

1. Specimens from the Continent, Cuba and Haiti have the thorax brownish, at least in front, and the brown markings and patches of the forewing distinct; this is Boisduval's *rhaebus* (Pl. VIII. f. 6, ♀ ; 7, ♂).

2. An individual without locality, in the Tring Museum, agrees fairly well with Hübner's figure of *stheno*, differing from Continental individuals in the forewing being shorter, less elongate, and in the mesial basi-apical line being widely interrupted on the disc, the apical portion joining the oblique streak which stands before hinder angle, and forming thus a kind of submarginal band. The harpe of this specimen (Pl. XLV. f. 23) is also obviously different, being slenderer and more spatulate than in Continental examples ; this may be true *stheno* (Pl. VIII. f. 9, ♂).

3. The specimens from Jamaica (Pl. VIII. f. 8, ♂) are very pale in both sexes on thorax and forewing ; the longitudinal streak of the forewing of the ♂ is feebly marked, and the oblique streak before hinder angle is absent ; the brown shading of the forewing of the ♀ is less distinct than in the Continental ♀, the Jamaica ♀♀ agreeing nearly with the description of Grote's *pallida* from Cuba. Our Cuba and Haiti ♀♀ and those in the British Museum as well as ♂♂ and ♀♀ from Haiti in the Paris Museum are not essentially different from Continental examples.

The types of *obscura* and *stheno* came from the West Indies ; possibly *obscura* and *stheno* are the same. More material from Cuba must be compared before it is possible to say whether *pallida* is based on an abnormally pale ♀, or whether the pale Jamaica form occurs normally also in Cuba, perhaps in the eastern districts.

In the Tring Museum 33 ♂♂, 28 ♀♀ from : Jamaica ; Cuba ; Haiti ; Mexico southwards to Argentina and Southern Brazil.

299. **Erinnyis domingonis** (Pl. VIII. f. 12, ♀ ; 13, ♂).

Ancerya obscura, Walker (*non* Fabricius, 1775), *List Lep. Ins. B. M.* viii. p. 226. n. 7 (1856) (partim).

**Dilophonota domingonis* Butler, *Proc. Zool. Soc. Lond.* p. 258. n. 52 (1875) (Haiti ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 604. n. 6 (1877); Kirby, *Cat. Lep. Het.* i. p. 697. n. 10 (1892); Schaus, *Ent. News* ix. p. 136 (1898) (= *festa*).

Dilophonota rhaebus, Druce (*non* Boisduval, 1875), in *Biol. Centr. Amer., Lep. Het.* i. p. 19. n. 5 (1881).

Dilophonota festa Edwards, *Papilio* ii. p. 11 (1882) (N.W. Texas ; in coll. Neumoegen) ; Smith. *Trans. Amer. Ent. Soc.* xv. p. 161 (1888) (N.W. Texas); Kirby, *l.c.* p. 696. n. 4 (1892); Ottol., *Ent. News* vi. p. 218 (1895) (Texas, in coll. Neumoegen) ; Druce, *l.c. Suppl.* p. 314. n. 5 (A) (1896) (Jalapa ; Costa Rica).

Dilophonota obscura ab. *festa*, Rothschild, Nov. Zool. i. p. 95 (1894).

♂♀. Forewing in both sexes brownish black for the greater part, differing in this respect conspicuously from that of *obscura*, with which *domingonis* agrees in the colour of the hindwing and in size; a median and a larger subapical costal patch and the distal marginal area more or less extended grey. The longitudinal line of the ♂ of *obscura* is also present in *domingonis*, but much less distinct, owing to the dark colour of the wing.

♂. Sexual armature essentially as in *obscura* ; process of harpe less curved, uneven at upper edge, and deeper notched at end.

Early stages not known.

Hab. West Indies; Texas to Paraguay ; probably also Southern Brazil.

In the Tring Museum 9 ♂♂, 7 ♀♀ from : Orizaba, Mexico, iii. iv. (Schaus) ; Costa Rica (Underwood) ; Rio Cachyaco, Peru (Stuart) ; Aroa, Venezuela, iv. ; La Paz, Bolivia ; Paraguay.

300. Erinnyis guttularis (Pl. VIII. f. 15, ♂).

**Ancerya guttularis* Walker, *List Lep. Ins. B. M.* viii. p. 227. n. 8 (1856) (Haiti ;—Mus. Brit.) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 177. n. 77 (1859) ; id., in Morris, *Syn. Lep. N. Am.* p. 202 n. 5 (1862) ; Herr.-Sch., *Corresp. Bl.* p. 60 (1865) (Cuba).

Erinnyis guttularis, Grote, *Proc. Ent. Soc. Philad.* v. p. 79 (1865) ; id. & Rob., *ibid.* p. 168. n. 115 (1865) (Cuba).

Dilophonota guttularis, Grote, *l.c.* vi. p. 329 (1867) (Cuba) ; Gundl., *Contr. Ent. Cubana* p. 226 (1882) ; Kirby, *Cat. Lep. Het.* i. p. 697. n. 15 (1892) (Haiti).

Ancerya guttulalis (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 133. n. 21 (1875) (Haiti ; Cuba).

Ancerya pallida, id., *l.c.* p. 134. n. 22 (1875 (Cuba).

Ancerya ? suillus id., *l.c.*

Dilophonota gutturalis (!), Morris, *l.c.* Index (1862) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 604. n. 9 (1877) (Haiti) ; Rothsch., Nov. Zool. i. p. 95 (1892).

♂♀. The smallest species of the genus ; the forewing similar to that of *obscura* : the hindwing with the ferruginous colour of the other species vestigial ; hindwing below white in basi-abdominal area.

♂. Process of harpe not spatulate, slightly acuminate, somewhat twisted, resembling the blade of a knife. Dextro-lateral row of teeth of penis-sheath long, the teeth strong but not numerous ; the left-side row short.

Early stages not known.

Hab. Haiti and Cuba.

In the Tring Museum 4 ♂♂, 1 ♀ from Haiti and Cuba.

XCI. GRAMMODIA gen. nov.—Typus : *caicus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Ex.* ii. p. 42 (1777).

Phryxus Hübner, *Verz. bek. Schm.* p. 137 (1822) (partim ; type : *livornica*).

Ancerya Walker, *List Lep. Ins. B. M.* viii. p. 222 (1856) (partim ; type : *pinastri*).

Erinnyis, Grote (*non* Hübner, 1822), *Proc. Ent. Soc. Philad.* v. p. 72 (1865).

Dilophonota, id. (*non* Burmeister, 1822), *l.c.* vi. p. 329 (1867).

Choerocampa, Boisduval (*non* Duponchel, 1835), *Spec. Gén. Lép. Hét.* i. p. 249 (1875).

♂♀. Differs from *Erinnyis* in the distal margin of the forewing being even. Crest of thorax very feeble ; R^3 and M^1 of hindwing close together.

Larva of the same shape as in *Erinnyis*, with short horn ; green, with an orange dorso-lateral side-line.

Chrysalis striped as in *Isognathus* and *Erinnyis*.

Hab. Tropical and Subtropical America.

One species.

301. Grammodia caicus.

Sphinx caicus Cramer, *Pap. Exot.* ii. p. 42. t. 125. f. F. (1777) (Surinam) ; Goeze, *Ent. Beytr.* iii. 2. p. 222. n. 64 (1780) ; Lep. & Serv., *Enc. Méth.* x. p. 465. t. 66. f. 8 (1825).

Sphinx cacus (!), Fabricius, *Spec. Ins.* ii. p. 151. n. 48 (1781) ; id., *Mant. Ins.* ii. p. 97. n. 52 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2378. n. 68 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 375. n. 57 (1793).

Phryxus caicus, Hübner, *Verz. bek. Schm.* p. 137. n. 1469 (1822) ; Burm., *Descr. Rép. Argent.* v. p. 334 (1878) (Buenos Ayres) ; Butl., *Trans. Ent. Soc. Lond.* p. 40. n. 4 (1878) (Amazons) ; Kirby, *Cat. Lep. Het.* i. p. 697. n. 1 (1892).

Ancerya caicus, Walker, *List Lep. Ins. B. M.* viii. p. 228. n. 10 (1856) (Haiti ; Honduras) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 177. n. 79 (1859) ; id., in Morris, *Syn. Lep. N. Am.* p. 203. n. 7

(1862) ; Herr.-Sch., *Corresp. Blatt* p. 59 (1865) (Cuba) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 346 (1876) ; id., *l.c.* xxxii. p. 332 (1882) (Surinam).

Erinnyis caicus, Grote, *Proc. Ent. Soc. Philad.* v. p. 72 (1865) (Cuba) ; id. & Roh., *ibid.* p. 167. n. 106 (1865).

Dilophonota caicus, Grote, *l.c.*, vi. p. 329 (1867) (Cuba) ; id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) (Cuba) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 605. n. 11 (1877) ; Druce, in Biol. Centr. Amer., *Lep. Het.* i. p. 20. n. 6 (1881) (Honduras ; Chiriqui ; Ecuador) ; Gundl., *Contr. Ent. Cubana* p. 224 (1882) (larva and pupa).

Choerocampa caicus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 249. n. 30 (1875) (Cayenne ; Cuba).

♂ ♀. The species is easily recognised by the pale lines behind end of cell of forewing, the bright rufous hindwing with the black distal band entirely separated into vein-spots, and the sharply banded abdominal tergites.

♂. Lobes of tenth tergite about five times as long as broad in middle, obtuse ; processes of sternite longer than the tergal lobes, apex curved downwards. Clasper narrow, acuminate ; harpe slender, not distinctly dilated at end. Penis-sheath similar to that of *Erinnyis crameri*.

Hab. Florida ; West Indies ; Central and South America, as far south as Buenos Ayres. Not yet recorded from Mexico.

In the Tring Museum 9 ♂ ♂, 6 ♀ ♀ from : Florida ; Haiti ; Aroa, Venezuela ; British Guiana, vii. xii. ; Iquitos (Stuart).

Tribe **Sesiicae**.—Typus : *Haemorrhagia tityus*.

Sesiidae Stephens, *Illustr. Brit. Ent., Haust.* i. p. 132 (1828) (partim ; type : *Haemorrhagia tityus*).

♂ ♀. Abdominal spines not uniseriate, or if uniseriate then thorax not double-crested. End-segment of antenna long or short, in the former case the midcoxal merum angulate.

Hab. Cosmopolitan, but only three genera in the Old World.

20 genera ; 102 species.

Key to the genera see p. 350.

XCII. PACHYLIA.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Eugo Hübner, *Verz. bek. Schm.* p. 132 (1822) (partim ; type : *japix*).
Pholus id., *l.c.* p. 134 (1822) (partim ; type : *crantor*).
Deilephila, Burmeister, (*non* Laspeyres, 1809), *Sphing. Bras.* p. 67 (1856).
Pachylia Walker, *List Lep. Ins. B. M.* viii. p. 189 (1856) (type : *ficus*).
Choerocampa, Ménétriés (*non* Duponchel, 1835), *Enum. Corp. Anim. Mus. Petr.* ii. p. 133 (1857).

♂ ♀. Eye large, not lashed. Antenna setiform, without the trace of a club, hook long, slender ; end-segment long, compressed, conical or filiform, except at base, penultimate segment longer than vertically broad. Palpus different in the four species, smooth-scaled. Abdomen with triangular tail in ♂, simply pointed in ♀ ; spines very heavy, in one row, the long ones alternating with small ones, or the small ones absent, in which case the long ones stand separated ; first sternite (second segment) with very few or with many spines. Hinder edge of midcoxa cariniform, faintly angulate. Comb of midtarsus present. Distal margin of forewing entire, apex pointed ; cross-veins of hindwing oblique, lower angle of cell acuminate, R^3 and M^1 rather close together.

♂. Forecoxa with scent-organ. Tenth segment divided. Clasper with many erect friction-scales.

♀. Seventh sternite without spines.

Larva cylindrical, thoracical segments not enlarged. A dorso-lateral stripe from thorax or head to horn, from this stripe oblique bands extend downwards and backwards. Horn short in adult.—Food-plants : *Ficus ; Artocarpus.*

Pupa imperfectly described.

Hab. Tropical and Subtropical America.

Four species.

Key to the species :

a. Hindwing with white marginal spot at tip of SM^2 . . . . . *b.*
Hindwing without white marginal spot at tip of SM^2 . . . . . *c.*

b. Hindwing without distinct black median band . 303. *P. syces.*
Hindwing with distinct black median band . 302. *P. ficus.*

c. Hindwing with distinct black median band . 305. *P. resumens.*
Hindwing without distinct black median band . 304. *P. darceta.*

302. **Pachylia ficus.**

Merian, *Metam. Ins. Surin.* t. 33. fig. sup. dextera (1705) (larva & pupa this species or *syces*).

Sphinx ficus Linné, *Syst. Nat.* ed. x. p. 491. n. 13 (1758) ; Linné, *Mus. Lud. Ulr.* p. 353 (1764) ; Clerck, *Icon. Ins.* ii. t. 49. f. 2 (1764) ; Linné, *Syst. Nat.* ed. xii. p. 800. n. 15 (1767) ; Drury, *Illustr. Ex. Ent.* ii. p. 44. t. 26. f. 1. & Index (1770-73) (Jamaica) ; Müll., *Naturs.* v. 1. p. 639. n. 15 (1774) ; Fabr., *Syst. Ent.* p. 540. n. 13 (1775) ; Cram., *Pap. Ex.* iii. p. 90. t. 246. f. E (1779) ; Goeze, *Ent. Beytr.* iii. 2. p. 164. n. 15 (1780) ; Fabr., *Spec. Ins.* ii. p. 145. n. 26 (1781) ; id., *Mant. Ins.* ii. p. 95. n. 29 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2380. n. 15 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 366. n. 31 (1793) ; Thunb., *Mus. Nat. Ups.* xxiii. p. 9 (1804) ; Turt., *Syst. Nat.* iii. 2. p. 172 (1806) ; Drury, ed. Westw., *Illustr. Ex. Ent.* ii. p. 48. t. 26. f. 1 (♀) (1837).

Pholus ficus, Hübner, *Verz. bek. Schm.* p. 134. n. 1438 (1822).

Deilephila ficus, Burmeister, *Sphing. Bras.* p. 61. n. 1 (1856).

Pachylia ficus, Walker, *List Lep. Ins. B. M.* viii. p. 189. n. 1 (1856) (partim) ; Lucas, in Sagra, *Hist. Cuba* p. 295 (1856) ; Clem., *Journ. Ac. Nat. Sci. Philad.* iv. p. 158. n. 14 (1859) (synon. partim) ; Morris, *Cat. Lep. N. Am.* p. 19 (1860) (partim) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 181. n. 1 (1862) ; Herr.-Sch., *Corresp. Bl.* p. 58 (1865) (Cuba) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 62 (1865) (Cuba) ; id. & Rob., *ibid.* v. p. 158. n. 59 (1865) (Cuba) ; Grote, *l.c.* vi. p. 329 (1867) (Cuba) ; Boisd., *Cons. Lép. Guatemala* p. 72 (1870) (partim) ; Schauf., *Nunq. Otios.* i. p. 16 (1870) (Surinam) ; Grote, *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) (Cuba) ; Wallengr., *Öfv. Vet. Ak. Förh.* xxviii. p. 913. n. 15 (1871) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 136. n. 3 (1875) (partim) ; Grote, *Bull. Buffalo Soc. N. Sc.* ii. p. 226. n. 31 (1875) (Florida) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 347 (1876) (Surinam) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 578. n. 1 (1877) (Mexico ; Haiti) ; Grote, *l.c.* iii. p. 222. n. 33 (1877) (Florida) ; Dew., *Mitth. Münch. Ent. Ver.* i. p. 91 (1877) (Porto Rico) ; Butl., *Trans. Ent. Soc. Lond.* p. 40 (1878) (Amazons) ; id., *Proc. Zool. Soc. Lond.* p. 483. n. 54 (1878) (Jamaica) ; Maass., *Stett. Ent. Zeit.* xli. p. 59 (1880) (*undatifascia = ficus*) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 15. n. 1 (1881) ; Gundl., *Contr. Ent. Cubana* p. 200 (1882) (Cuba) ; Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 15. p. 135. n 171 (1882) (recensio critica) ; Schaus, *Papilio* iv. p. 21 (1884) (larva noticed) ; Snell., *Tijdschr. Ent.* xxx. p. 34 (1887) (Curaçao) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 138. t. 6. f. 1. 2 (genit.) (1888) (Florida ; Texas) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 42 (1889) (liter. rel. to metam.) ; Kirby, *Cat. Lep. Het.* i. p. 678. n. 1 (1892) ; Druce, *l.c. Suppl.* p. 309 (1896) ; Sloss., *Ent. News* x. p. 96 (1899) (Florida) ; Hamps., *Ann. Mag. N. H.* (7). vii. p. 250 (1901) (Bahamas).

Chnerocampa crameri Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. p. 133. n. 1511. & *Suppl.* p. 91 (1857) (Bahia).

Pachychia lyncea Clemens, *l.l.c.c.* ("♂ of *ficus*, or distinct?") ; Morris, *l.c.* (1860) ; Grote, *Bull.*

Buffalo Soc. N. Sc. i. p. 22 (1874) (Texas) ; id., *l.c.* ii. p. 226. n. 32 (1875) (Texas) ; id., *l.c.* iii. p. 222. n. 34 (1877) (Texas).

Pachylia ficus var. *venezuelensis* Schaufuss, *Nunq. Otios.* i. p. 16 (1870) (Venezuela).

Pachylia undatifascia Butler, *l.c.* ix. p. 578. n. 2 (1877) (Haiti ; Brazil) ; Kirby, *l.c.* n. 2 (1892).

Pachylia ficus A., Bönninghausen, *Iris* xii. p. 118. n. 26 (1899) (Rio de Jan.).

Pachylia ficus B., id., *l.c.* n. 27 (1899) (larva noticed).

Pachylia ficus B. var. *aterrima* id., *l.c.* p. 119. sub n. 27 (1899) (Rio de Jan.).

♂♀. Eye large. End-segment of antenna long, filiform distally, about as long as the four previous segments together. Palpus prominent, broad at end, less triangular than in *syces*, but more projecting than in *resumens* and *darceta*. Spines of abdomen long and strong, and separate on tergites and sternites ; there are no, or few, small weak spines. First segment of hindtarsus of ♀ as long as 2 to 5 together, shorter in ♂ ; long terminal hindtibial spur as long as half the first tarsal segment, but somewhat variable. The ♂ generally less olive than the ♀ ; markings of forewing variable in distinctness. The brown side-patches of the abdomen often vestigial. West Indian individuals on the whole less variegated than Continental ones.

♂. Scent-organ of fore-coxa not strongly developed. Tenth tergite of abdomen (Pl. XLII. f. 1, dorsal view) divided into two long, slender, pointed, densely hairy processes, which are almost parallel, curving a little ventrad and laterad at end ; sternite vestigial, *without* processes. Clasper (Pl. XLVI. f. 2) broadly sole-shaped : a patch of short stiff hairs near the base on inner surface ; harpe short, horizontal, ending in a very obtuse process, which is beset at upper edge with spines pointing upward and basad. Penis-sheath (Pl. LIII. f. 12) with a few teeth at the right side.

♀. Eighth tergite sinuate, feebly chitinised distally, strongly chitinised proximally and at the sides. Vaginal plate large, not sharply defined distally, its apical edge not being incrassate or elevate ; orifice in a large impression, the walls of which are somewhat raised ; postvaginal part of impression scaled ; no further armature ; proximal part membranaceous, folded (Pl. XL. f. 15). Seventh sternite elongate-trapeziform, about as long as proximally broad ; apex truncate, sharply defined, apical edge about 3 mm. long, angles rounded.

Larva green, with a yellow dorso-lateral line from the head to the tip of the short horn, from this line run on each segment, except first, backwards to hinder margin a yellow oblique band (Burmeister, *l.c.*). Changing before pupation into orange above, bluish grey below.—Food-plant : *Ficus*.

Hab. Florida, Texas, West Indies, southward to Buenos Ayres.

A common species.

In the Tring Museum 60 odd specimens from : Jamaica ; Cuba ; Bahamas ; Trinidad ; various places of Central and South America, southward to Bolivia, Argentina, and Southern Brazil.

303. Pachylia syces.

Merian, *Metam. Ins. Surin.* t. 33 fig. sup. sinistra (1705) (larva and pupa this species or *ficus*).

Sphinx ficus, Stoll (*non* Linné, 1758), in Cram., *Pap. Ex.* iv. p. 216. t. 394. f. D (1782) (Surinam).

Enyo syces Hübner, *Verz. bek. Schm.* p. 132. n. 1424 (1822).

Pachylia ficus, Walker, *List Lep. Ins. B. M.* viii. p. 189. n. 1 (1856) (partim) ; Boisd., *Cons. Lép. Guatemala* p. 72 (1870) (partim) ; id., *Spec. Gén. Lép. Hét.* i. p. 136. n. (1875) (partim).

Chaerocampa ficus, Ménétriés, *Enum. Corp. Anim. Mus. Petr.* ii. p. 133. n. 1511. & Suppl. p. 91. n. 1511 (1857) (Haiti).

Pachylia syces, Butler, *Trans. Zool. Soc. Lond.* ix. p. 578. n. 4 (1877) (Brazil ; Jamaica ; Haiti ; = *inornata*) ; Kirby, *Cat. Lep. Het.* i. p. 678. n. 5 (1892) (Brazil ; Antilles).

Sphinx fius (!), Gundlach, *Contr. Ent. Cubana*, p. 201 (1881) (sub synon.).

♂♀. Palpus triangular, pointed, differing markedly from that of the other species. Merum of mid- and hindcoxae somewhat angulate. Spines of abdominal tergites contiguous, long and short ones almost regularly alternating ; those on sternites much weaker and more numerous ; first sternite with spines. First hindtarsal segment about two-thirds the length of the tibia, barely as long as segments 2 to 4 together ; spurs shorter than in *ficus*.

Body and wings much darker than in *ficus*.——Forewing with broad, interrupted or complete, paler median band, which is much broader at costal than at hinder margin, and includes the minute black stigma.——Hindwing almost unicolorous, darker distally, without distinct bands.

♂. Scent-organ of forecoxa small. Tenth tergite (Pl. XLI. f. 22, dorsal view) divided into two lobes, which are widely separated by a rounded sinus, the lobes broad, slanting, somewhat twisted, apically roundedly excised ; sternite (*Xe*) also produced into processes, which are, however, very much longer than the tergite (*Xt*), and are internally dilated into a broad tooth. Clasper (Pl. XLVI. f. 1) rather narrower than in *ficus* ; the harpe similar, but spines heavier, apex broader. Penis-sheath (Pl. LIII. f. 11) obtuse, with some minute teeth at the left side ; numerous spines within the sheath.

♀. Eighth tergite short, truncate, shallowly sinuate, membranaceous in middle distally. Vaginal plate (Pl. XL. f. 16) distally sharply defined, the apical margin raised, angulate mesially, continued basad, forming the border of a large, mesial, rounded depression, in which is situated the rather small vaginal orifice ; anterior edge of the orifice raised. Seventh sternite broader than long, trapeziform, apex truncate, not membranaceous, no spines.

Larva said to be like that of *ficus*, but larger (?). Bönninghausen describes it as being lighter green than *ficus*, and becoming black with green belts shortly before pupation.—Food-plants : *Artocarpus ; Ficus*.

Hab. Mexico, West Indies, southward to Southern Brazil.

Two subspecies :

a. P. syces syces.

Sphinx ficus, Stoll, *l.c.*
Enyo syces Hübner, *l.c.*
Pachylia inornata Clemens, *Journ. Ac. N. Sc. Philad.* iv. p. 159. n. 49 (1859) (Honduras ; Brazil) ; Morris, *Cat. Lep. N. Am.* p. 19 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 182. n. 2 (1862).
Pachylia syces, Butler, *l.c.* (partim) ; Burm., *Descr. Rép. Argent.* v. p. 340 (1878) ; id., *l.c. Atlas* p. 35. t. 14. f. 3 (*l.*) 6. 7. 8 (*p*) (1879) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 15. n. 3 (1881) (Mexico ; Belize ; Chiriqui ; Ecuador ; Upp. Amazons ; Paraguay) ; id., *l.c. Suppl.* p. 309 (1896) (Mexico ; Costa Rica) ; Bönningh., *Iris* xii. p. 119. n. 28 (1899) (Rio de Jan. ; larva noticed).

♂♀. Pale median interspace of forewing separated into two patches : one costal, large, including the stigma, the other small, at hinder margin ; the two patches seldom connected, but if so, the band thus formed strongly constricted ; the posterior patch sometimes vestigial.

Hab. Continental America, from Mexico to Southern Brazil and Bolivia.

In the Tring Museum 50-odd specimens from : Mexico ; Costa Rica ; Colombia ; Venezuela ; Ecuador ; Peru ; Bolivia ; Bahia ; Rio de Janeiro ; Sao Paulo.

b. P. syces insularis subsp. nov.

Pachylia ficus, Walker, *l.c.* (partim).
Pachylia syces, Butler, *l.c.* (partim).

Pachylia spec., Herrich-Schäffer, *Corresp. Bl.* p. 58 (1865) (Cuba).

Pachylia inornata, Grote (*non* Clemens, 1859), *Proc. Ent. Soc. Philad.* v. p. 63 (1865) (Cuba) : id. & Rob., *ibid.* v. p. 159. n. 60 (1865) ; id., *l.c.* vi. p. 328 (1867) (Cuba) ; id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) (Cuba) ; Gundl., *Contr. Ent. Cubana* p. 201 (1882) (Cuba).

♂ ♀. Pale median interspace of forewing not interrupted, its proximal edge concave, distal edge straight or very faintly concave behind middle.

Hab. West Indies : Jamaica ; Haiti ; Cuba.

We have not seen Cuba specimens.

In the Tring Museum 4 ♂♂, 3 ♀♀ from : Jamaica (*type*, ♂) ; Haiti.

304. Pachylia darceta.

**Pachylia darceta* Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 15. n. 2. t. 2. f. 4 (♀) (1881) (Chiriqui ;—coll. Staudinger) ; Kirby, *Cat. Lep. Het.* i. p. 678. n. 4 (1892).

♂ ♀. Palpus rather more prominent than in *resumens*, but also rounded as in that species. Antennal segments, spines of abdomen, and merum of coxae essentially as in *resumens*.

Upperside very uniform in colour.——Forewing with three oblique black lines, two in basal half, the third almost longitudinal, from upper angle of cell along R^3 ; stigma black, round, prominent.——Hindwing without markings.

Underside paler, three lines on disc.

♂. Scent-organ of forecoxa less developed than in *resumens*, but more than in the other species. First hindtarsal segment only one-fourth shorter than the tibia, with long scales at the base ventrally. Processes of tenth tergite (Pl. XLII. f. 4, ventral view ; f. 5, lateral view) very much shorter than in *resumens*, less compressed, very obtuse at end, and here widely apart ; processes of sternite represented by two *short*, subtriangular lobes which are widely separated from one another (*Xr*). Clasper elongate, as in *Erinnyis*, the patch of bristles of *resumens* wanting ; the double basal tubercle prolonged (*t*), pointed, densely punctate-rugate ; harpe of right and left clasper different, the right one narrowing into a heavy ventro-distal process (Pl. XLV. f. 26), which bears at or near the point of curvature of the upper edge a small tooth ; this tooth is developed on the left harpe (Pl. XLV. f. 27) into a long, slender, pointed, recurved process, which reaches a little beyond the dorsal edge of the clasper. Penis-sheath produced dorsally into an obtuse lobe, which bears a row of teeth at the right and left edges, the rows meeting at the end of the lobe.

♀. Not dissected.

Early stages not known.

Hab. Chiriqui to Bolivia and Para.

In the Tring Museum 10 ♂♂ from : Rio Dagua, Colombia (Rosenberg) ; S. Javier, R. Cachabi, Ecuador ; Bolivia ; Amazons.

In coll. Standinger 1 ♂, 1 ♀ from Iquitos ; 1 ♂ from Rio Songo, Bolivia ; 1 ♀ (*type*) from Chiriqui.

In Mus. Bern from Para (Dr. Goeldi), at the electric light, iii. viii.

305. Pachylia resumens.

**Pachylia resumens* Walker, *List Lep. Ins. B. M.* viii. p. 190. n. 2 (1856) (Rio de Jan. ; Honduras ; Haiti ;—Mus. Brit.) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 159. n. 50 (1859) ; Morris, *Cat. Lep. N. Am.* p. 19 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 183. n. 3 (1862) ; Herr.-Sch., *Corresp. Bl.* p. 58 (1865) (Cuba) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 63 (1865) (Cuba) ; id. & Rob., *ibid.* v. p. 159. n. 61 (1865) ; Grote, *ibid.* vi. p. 329 (1867) (Cuba) ; Herr.-Sch., *Ausser.*

Schm. f. 556 (1869) (fig. mala) ; Grote, *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 579. n. 5 (1877) (Haïti ; Honduras ; Rio de Jan.) ; Burm., *Descr. Rép. Argent.* v. p. 340. n. 2 (1878) (Buenos Ayres ; N. Friburgo ; larva on *Ficus*) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 16. n. 4 (1881) (Honduras ; Nicaragua ; Chiriqui) ; Kirby, *Cat. Lep. Het.* i. p. 678. n. 6 (1892) ; Schaus, *Ent. News* vi. p. 141 (1895) (= *inconspicua*) ; Druce, *l.c. Suppl.* p. 309 (1896) (Mexico ; Belize ; Guatemala) ; Bönningh., *Iris* xii. p. 119. n. 29 (1899) (Rio de Jan. ; rare).

**Pachylia inconspicua* Walker, *List Lep. Ins. B. M.* viii. p. 190. n. 3 (1856) (Jamaica ;—Mus. Oxford) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 159. n. 49 (1859) ; Morris, *Cat. Lep. N. Am.* p. 19 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 183. n. 4 (1862); Grote & Rob., *l.c.* v. p. 159. n. 62 (1865) (Jamaica) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 138. n. 5 (1875) ; Butl., *l.c.* p. 579. n. 6 (1877) (Jamaica) ; Kirby, *l.c.* n. 7 (1892).

Chaerocampa versuta Clemens, *Journ. Ac. Nat. Sci. Philad.* iv. p. 152. n. 38 (1859) (Mexico) ; Morris, *Cat. Lep. N. Am.* p. 20 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 174. n. 7 (1862) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 11. n. 14 (1881) (" not seen ").

Pachylia tristis Ménétriés, *Enum. Corp. Anim. Mus. Petrop.* ii. *Lep.* p. 91. n. 1510 (1857) (Brazil, *nom indescr.* !) ; Grote & Rob., *Trans. Amer. Ent. Soc.* iii. p. 75 (1871) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 138. n. 4. (1875) (Brazil ; Cuba) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 347 (1876) (Surinam).

Phachylia (!) *resumens*, Gundlach, *Contr. Ent. Cubana* p. 202 (1882).

Theretra versuta, Kirby, *Cat. Lep. Het.* i. p. 657. n. 87 (1892).

♂ ♀. Clemens's description of *versuta* applies to this insect ; a comparison of the characters he mentions with a specimen of *resumens* will convince every one of the correctness of our identification. The species varies a good deal individually, but apparently not geographically. The markings of the forewing are sometimes almost obliterated. The ♀ is on the whole more olivaceous than the ♂, and has the pale postdiscal band of the hindwing often nearly concolorous with the basal area, while it is much more clayish in the ♂. The ferruginous-tawny colour of the underside of the forewing at the brown distal marginal band appears often on the upperside. All the abdominal tergites have a black basal belt; the belts of the proximal segments are visible, at least laterally, also in specimens with the segments well telescoped into one another ; posterior tergites with single, well separated, long and strong spines ; spines of proximal tergites much shorter and weaker, and much more numerous, standing close together ; spines of proximal sternites contiguous, of posterior ones separate, stronger chitinised spines generally alternating with weaker ones. Palpus closely appressed to head, rounded in lateral and dorsal views, not projecting. Penultimate segment of antenna longer than vertically broad. Hinder edge of merum of mid- and hindcoxa carinate, very faintly angulate. External spur of midtibia only one-fourth shorter than internal one. Hindwing similar in pattern to that of *P. ficus*.

♂. Scent-organ of forecoxa strongly developed. Scales at upper and lower edges of the hindtibia and of the first hindtarsal segment prolonged ; hindtarsus with some spines between the four regular rows, first segment a little less than half the length of the tibia. Tenth tergite (Pl. XLII. f. 6, ventral view ; f. 7, lateral view) with two long processes, which are broadest at end, curved downward, and somewhat twisted, the flat side being nearly vertical ; the two processes of the sternite as long as the tergite, the left a little shorter than the right, both somewhat compressed and slightly S-shaped, apex not very acute ; anal cone projecting between the lobes of the segment in lateral view (Pl. XLII. f. 6). Clasper sole-shaped, broader and shorter than in *Erinnyis*, with a patch of stiff bristles on the inner surface in the middle of the dorsal margin (Pl. XLV. f. 28) ; a double basal tubercle (*t*), smooth, the lower one carinate ; harpe produced ventrally into a strongly hooked, short process, which is plainly visible from the

outside. Penis-sheath (Pl. LIII. f. 10) with an obtuse straight apical process, which bears a row of teeth at the left edge, the row generally double proximally.

♀. Eighth tergite rounded-sinuate, the lobes strongly rounded. Vaginal plate (Pl. XL. f. 17) rather large, apical edge membranaceous, a deep halfmoon-shaped proximal cavity, surrounded proximally by a smooth ridge ; vaginal orifice post-median, small, covered by a heart-shaped bilobate flap. Seventh sternite long trapeziform, apex membranaceous.

Larva resembling that of *ficus*, but smaller.

Hab. Florida, West Indies, southward to Buenos Ayres ; common in collections.

In the Tring Museum 90-odd specimens from : Florida, various places of Central and South America, southward to Bolivia, Paraguay, Parana (Brazil).

XCIII. ORYBA.—Typus : *achemenides*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* iii. p. 53 (1779).
Clanis Hübner, *Verz. bek. Schm.* p. 138 (1822) (partim ; type : *phaluris* = *nicobarensis*).
Pachylia Walker, *List Lep. Ins. B. M.* viii. p. 191 (1856) (partim ; type : *ficus*).
Oryba id., *l.c.* p. 197 (1856) (type : *achemenides* = *robusta*).

♂♀. Eye very large, not lashed, diameter about one and a half times the width of the frons. Palpus slender, smooth-scaled, closely appressed to head, pointed, not projecting, outline in side-view following the curve of the head. Antenna distinctly clubbed, end-segment very long, filiform, except at base, penultimate segment shorter than vertically broad. Abdominal spines heavy, in one row, long and short ones alternating on posterior tergites, contiguous, the spines of the sternites also very stiff; seventh sternite of ♀ broadly trapeziform, without spines. Merum of midcoxa angulate. Tarsi short-scaled, long ; midtarsus without comb. Distal margins of wings entire ; apex of forewing acute ; R of hindwing before centre of cell, hinder angle of cell acuminate, R^3 and M^1 rather close together, D^4 being only one-fifth to one-third the length of D^3.

♂. Seriated ciliae of antenna very short. Scent-organ of forecoxa large or small. Tenth segment divided, of the same type as in *Pseudosphinx*, *Pachylia*, *Erinnyis*, etc. ; the lobes of the broad tergite (Pl. XLII. f. 2. 3) broad, about half the length of the segment, the sinus between them wide, rounded ; sternite with two long and slender processes (*Xv*), which are pointed and distally curved. Clasper very large. Penis-sheath (Pl. LIII. f. 13. 14) forked, with apical sense hairs and short tooth-like spines resembling those found in *Nyceryx*, *Perigonia*, etc. ; penis-funnel produced into a long, more or less clubbed process, which is denticulate on the upperside.

♀. Vaginal plate triangular ; orifice proximal and mesial ; no obvious armature. Eighth tergite membranaceous mesially from apex to near base.

Early stages not known.

Hab. Central and South America, from Honduras to Bolivia and Southern Brazil, extending probably to Mexico.

Two species :

Distal marginal area of forewing as broad at R^3 as the interspace between this area and the first discal line (outside cell) . .	306. *O. kadeni*.
Distal marginal area very much narrower than that interspace	307. *O. achemenides*.

306. Oryba kadeni.

Pachylia kadeni Schaufuss, *Nunq. Otios.* i. p. 16 (1870) (Am. mer.).
Pachylia robusta, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 135. n. 1 (1875) (Brazil).
**Oryba imperialis* Druce, *Ann. Mag. N. H.* (6). v. p. 213 (1890) (Peru ;—coll. Druce) ; Kirby, *Cat. Lep. Het.* i. n. 3 (1892).
Oryba kadeni, Schaus, *Ent. News* vi. p. 141 (1895) (synon.) ; Druce, *l.c.* Suppl. p. 314. n. 2 (1896) (Chiriqui).
Oryba robusta, Kirby, *l.c.* n. 2. (1892) (partim) ; Rothsch., Nov. Zool. i. p. 88 (1894) ; Bönningh., *Iris* xii. p. 120. n. 31 (1899) (Rio de Jan. ; Para).

♂♀. Abdomen with small lateral tufts ; seventh (♀) or eighth (♂) tergite with long hair-scales which form a simple tuft in ♀, and an expansible fan in ♂. Antenna strongly clubbed ; black, with pale ventral mesial line. Eye very large. Abdominal spines broad, close together also on posterior tergites. Distal marginal area of forewing strongly convex ; discal trapeziform area sharply defined, bordered with white scaling.

♂. Scent-organ of forecoxa vestigial. Tenth tergite (Pl. XLII. f. 2) longer than broad, densely hairy, the lobes about twice as long as broad in middle in dorsal view ; sternite (*Xc*) little longer than the tergite. Clasper sole-shaped, with elongate-lanceolate, rather small friction-scales ; harpe not separated from the clasper (Pl. XLVI. f. 3). Penis-sheath (Pl. LIII. f. 13) divided into two slender processes, the incision extended proximad as a groove, each process ending in a short spine and two hairs, and bearing some short spines at the base ; process of penis-funnel slightly incrassate distally.

Hab. Chiriqui to Bolivia and Southern Brazil.

In the Tring Museum 7 ♂♂, 2 ♀♀ from : Peru ; Gnanay, Mapiri R., Bolivia, 1500 ft., iii. '95 (Stnart) ; Espirito Santo.

307. Oryba achemenides.

Sphinx achemenides Cramer, *Pap. Exot.* iii. p. 53. t. 225. f. c (1779) (Surinam) ; id., *l.c.* p. 133. t. 265. f. A. B. (1779) ; Goeze, *Ent. Beytr.* iii. 2. p. 228. n. 93 (1780).
Sphinx achmenides (!) Cramer, *l.c.*
Clanis achemenides, Hübner, *Verz. bek. Schm.* p. 138. n. 1482 (1822) ; Druce, *Ann. Mag. N. H.* (6). v. p. 214 (1890) (Colombia).
Pachylia achemenides, Walker, *List Lep. Ins. B. M.* viii. p. 191. n. 4 (1856) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 136. n. 2 (1875) ; Oberth., *Et. d'Ent.* vi. p. 31. t. 5. f. 2 (1881) (Teffe).
**Oryba robusta* Walker, *List Lep. Ins. B. M.* viii. p. 197. n. 1 (1856) (Brazil ;—Mus. Oxford) ; Kirby, *Cat. Lep. Het.* i. p. 678. n. 2 (1892) (partim).
Oryba achemenides, Kirby, *l.c.* n. 1 (1892) ; Rothsch., Nov. Zool. i. p. 88 (1894) ("Trinidad" err. loc. !) ; Schaus, *Ent. News* vi. p. 141 (1895) (synon. ; = *robusta*) ; Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 314. n. 1 (1896) (Honduras).

♂♀. Antenna slenderer and longer, and the eye smaller than in *kadeni* ; the former pale. Abdomen obtuse at end, without tuft, the spines slenderer and, below, weaker than in the preceding. More uniform in colour ; marginal area of forewing much narrower, the discal area less prominent, the hindwing without distinct bands ; distal margin of forewing concave in ♂ from R^2 to hinder angle ; D^3 of hindwing very long, lower angle of cell much produced.

♂. Forecoxa with strongly developed scent-organ. Tenth tergite (Pl. XLII. f. 3) shorter than broad, the lobes very strongly rounded ; processes of sternite (*Xc*) much longer than the tergite, strongly curved at end. Clasper (Pl. XLVI. f. 4) with a peculiar scent-organ ; ventral margin straight, upper one convex, membranaceous, swollen, as if being inflated ; the greater part of the clasper covered

outside by a large mass of long stout hairs, which lie flat upon the clasper ; these hairs are very brittle ; the edge of the eighth tergite is also swollen, inflated, membranaceous ; no distinct harpe. Penis-sheath (Pl. LIII. f. 14) less deeply divided than in *kadeni*, the left process short ; process of penis-funnel (P-F) obviously clubbed.

♀. Eighth tergite little broader than long, strongly chitinised, truncate, angles rounded, membranaceous mesially. Vaginal plate triangular, apex broader than in the preceding.

Hab. Honduras to Bolivia and Northern Brazil.

In the Tring Museum 5 ♂♂, 4 ♀♀ from : Honduras ; S. Augustin, Mapiri R., Bolivia, 3500 ft., iv. '95 (Stuart) ; Maripa, Caura R., Venezuela, vi. vii. 1901 (S. Klages) ; Amazons (Bates).

In the Bern Museum from Para (Dr. Goeldi), at the electric light, iii. vi.

XCIV. LEUCORHAMPHA gen. nov.—Typus : *triptolemus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Ex.* iii. p. 40 (1779).
Hemeroplanes Hübner, *Verz. bek. Schm.* p. 133 (1822) (partim ; type : *pan*).
Calliomma Walker, *List Lep. Ins. B. M.* viii. p. 108 (1856) (partim ; type : *nomius*).
Triptogon Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 95 (1857) (partim ; *nom. indescr.* !).
Philampilus (!), Schaufuss (*non* Harris, 1839), *Nunq. Otios.* i. p. 19 (1870).
Madoryx Boisduval, *Spec. Gén. Lép. Hét.* i. p. 150 (1875) (partim ; type : *oiclus*).

♂ ♀. Palpi rounded in dorsal and lateral view. Scaling somewhat raised on occiput. Antenna very slender, with a long gradual hook, no prolonged seriated ciliae in ♀, end-segment long, gradually narrowed to a point. Spines of abdomen arranged in one row, sternites and proximal tergites with long and short spines alternating, distal tergites with long, strong, conical spines only, which are widely separate from one another ; seventh sternite of ♀ not spinose, membranaceous distally ; fan-tail of ♂ with three prolonged tufts, ♀ with a single tuft. Legs and neuration essentially as in *Hemeroplanes*. Distal margins dentate ; forewing angulate at R^3, with a longitudinal silvery streak at base of R^3.

♂. Sexual armature rather uniform : tenth tergite (Pl. XLII. f. 25) divided by a broad rounded sinus into two lobes ; sternite (*Xr*) a low ridge, produced at each side into a long, apical, curved, pointed process, which is much longer than the tergite. Clasper large, with a patch of lanceolate friction-scales ; above harpe there is basally a fold covered with bristles ; the harpes of the two claspers the same size, short, curved upwards at end, acuminate or sinuate. Penis-sheath (Pl. LIII. f. 20) of the same type as in *Madoryx* ; apically produced into a short obtuse process, which is beset at the edge with short teeth, and bears at the sides a dense covering of short spines, which break easily off, resembling a brush.

♀. Vaginal plate truncate, somewhat angulate in middle ; orifice mesial, without special armature, except a slight lateral and a proximal fold.

Larva (adult) flattened, without horn, head small, posterior thoracical segments enlarged ; mimicking a snake.

Hab. Central and South America ; not yet found in the West Indies.

Four species, which are closely allied to each other.

The differences between this genus and *Madoryx* are but slight. However, we think it advisable to keep *triptolemus* and allies generically separate from *oiclus* and allies, as each group of species represents a special type of development.

All the species of *Leucorhampha* have a blackish brown sinuate patch on the mesothoracic tegula, similar in shape to a basal patch on the forewing, and agree also in other respects closely with one another in colour and pattern.

Key to the species :

a. Silvery mark of forewing about 10 mm. long, reaching beyond postdiscal line . . 311. *L. longistriga*.
Silvery mark of forewing less than 6 mm. long, abdomen with yellow belts or spots . . . *b*.

b. Yellow belts of abdomen reduced to transverse dorsal spots . . . . . 310. *L. ornatus*.
Yellow belts of abdomen reaching round the whole tergite . . . . . *c*.

c. Silvery mark 4 to 5 mm. long, forked . . 308. *L. triptolemus*.
Silvery mark 3 mm. long, lower branch obliterated . . . . . 309. *L. diffusa*.

308. **Leucorhampha triptolemus.**

Sphinx triptolemus Cramer, *Pap. Ex.* iii. p. 40. t. 216. f. F (1779) (Surinam) ; Goeze, *Ent. Beytr.* iii. 2. p. 226. n. 86 (1780).
Hemeroplanes triptolemus, Hübner, *Verz. bek. Schm.* p. 133. n. 1426 (1822) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 543. n. 1 (1877) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 8 n. 1 (1881) (Guatemala ; Panama) ; Kirby, *Cat. Lep. Het.* i. p. 647. n. 1 (1892) (Brazil) ; Rothsch., Nov. Zool. i. p. 10 t. 6. f. 10 (1894) ; Druce, *l.c. Suppl.* p. 303 (1896) (partim ; Mexico).
Calliomma triptolemus, Walker, *List Lep. Ins. B. M.* viii. p. 111. n. 4 (1856) (Brazil ; Ega ; Para).
Triptogon triptolemus, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 95. n. 1569 (1857) (Brazil).
Philampilus (?) *triptolemus*, Schaufuss, *Nunq. Otios.* i. p. 19 (1870) (Surinam).
Madoryx triptolemus, Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 348 (1876) (Surinam).

♂ ♀. Yellow belts of abdomen extending from one side of the tergites to the other ; forewing with little or no greenish yellow scaling ; silvery mark 4 to 5 mm. long. Palpus, below, much more whitish grey in some specimens than in others.

♂. Harpe (Pl. XLVI. f. 16) with a comparatively slender, obtuse, curved process.

Hab. Mexico to Brazil.

In the Tring Museum 12 ♂♂, 7 ♀♀ from : Jalapa, Mexico, ii. iv. (Schaus) ; Aroa, Venezuela ; Merida, Venezuela, vi. (Briceno) ; Trinidad ; Fort George, ix. ; Rio Demerara ; Amazons ; Rio Dagua, Colombia (Rosenberg) ; Paramba, Ecuador, 3500 ft., v. '97, dry season (Rosenberg) ; 1 ♀ ex coll. Lennep.

309. **Leucorhampha diffusa** spec. nov. (Pl. VI. f. 10, ♂).

♂ ♀. Like the preceding with complete yellow dorsal belts to abdomen ; fringe of tergites also yellow. Wings deeper in colour, stronger dentate, broader. Forewing in basal area and on disc, hindwing in submarginal area, obviously shaded with bluish white scaling ; silvery mark only 3 mm. long, not forked proximally, the posterior branch being obsolete ; subbasal area of hindwing bluish white. Underside of body and wings more rufous than in *triptolemus*, postdiscal area along the greyish brown border ferruginous.

♂. Harpe (Pl. XLVI. f. 14) sinuate at end, both lobes obtuse, the upper one the longer.

Length of forewing : ♂, 45 mm. ; ♀, 47 mm.

Hab. Colombia to Bolivia, probably more widely distributed.

In the Tring Museum 1 ♂ (*type*) from Rio Dagua, Colombia (W. Rosenberg); 1 ♀ from Lita, Ecuador, 3000 ft. (Flemming); 1 ♂ (very bad) from San Augustin, Mapiri, 3500 ft., Sept. 1795 (Maxwell Stuart).

310. **Leucorhampha ornatus.**

Madoryx triptolemus, Boisduval (*non* Cramer, 1779); *Spec. Gén. Lép. Hét.* i. p. 154. n. 5 (1875) (Brazil; Cayenne).

**Hemeroplanes ornatus* Rothschild, Nov. Zool. i. p. 9. t. 6. f. 9 (1894) ("Venezuela" ex err.; S. America).

Hemeroplanes triptolemus, Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 303 (1896) (partim); Bönningh., *Iris* xii. p. 123. n. 44 (1899) (Rio de Jan.; larva),

Panacra spec. ?, Peters, *Illustr. Zeitschr. Ent.* iii. 6. plate (1898) (Nova Friburgo).

Hemeroplanes triptolemus, id., *l.c.* vi. t. 10. f. 1. 1a. b. c. (*l., p.*) (1901).

We cite Bönninghausen and Peters under this species, because *ornatus* seems to us to be the species referred to, not *triptolemus*, which is apparently much rarer in the province of Rio, if it occurs there at all.

♂♀. Abdominal yellow belts abbreviated, the yellow basal scaling restricted to a transversal dorsal patch; apical fringes also more or less yellowish; sides of tergites almost black as in *diffusa*.——Forewing much shaded with greenish yellow; silvery mark forked, 3 to 3½ mm. long.

♂. Harpe (Pl. XLVI. f. 15) much stouter than in *triptolemus*, sometimes sinuate nearly as in *diffusa*. Tenth segment see Pl. XLII. f. 25. Penis-sheath see Pl. LIII. f. 20.

Larva (fig. by Peters) assuming various defensive attitudes, imitating a snake; it throws the head so far back that the underside of the thorax, which is dark like the rest of the under surface, becomes the upper.

Hab. South America: Rio de Janeiro to Colombia.

In the Tring Museum 4 ♂♂, 5 ♀♀ from: Rio de Janeiro; Aroa, Venezuela; Rio Cachyaco, Prov. Iquitos (Stuart); Rio Dagua, Colombia (Rosenberg).

Also in other collections, generally confounded with *triptolemus*.

311. **Leucorhampha longistriga** spec. nov.

♂♀. Abdomen similar to that of *ornatus*, but without visible yellow basal patches. Forewing nearly as in *triptolemus*, but silvery mark very long, 10 mm., reaching beyond the postdiscal line, forked proximally, lower branch longer than upper; black submarginal band longer than in *triptolemus* and *ornatus*, reaching from tip of wing to R^3; ferruginous submarginal scaling of hindwing visible on upperside to near costa. Harpe similar to that of *triptolemus*, more strongly curved and more suddenly acuminate.

Hab. Brazil.

One ♂ in the Berlin Museum (*type*).

Another in coll. Charles Oberthür without locality.

A ♀ from Santa Catharina in coll. Standinger.

XCV. MADORYX.—Typus: *oiclus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Ex.* iii. p. 39 (1779).

Hemeroplanes Hübner, *Verz. bek. Schm.* p. 133 (1822) (partim; type: *pan*).

Calliomma Walker, *List Lep. Ins. B. M.* viii. p. 108 (1856) (partim; type: *nomius*).

Triptogon Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 94 (1857) (*nom. indescr.*; partim).
Zonilia?, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 144 (1875).
Madoryx id., *l.c.* p. 150 (1875) (type: *oiclus*).

♂♀. Differs from *Leucorhampha* in the posterior tergites of the abdomen being armed with a row of alternately long and short spines. ♀ without prolonged anal tuft; sternite and tergite of seventh segment broad, truncate. Sexual armature of ♂ similar to that of *Leucorhampha*; harpe short, triangular, not or little curved.

Larva very peculiar (*M. pluto*, see below), in general aspect more like the larva of a *Catocola* than a Sphingid. First stages with long slender horn, which is replaced by a short cone later on. It pupates in a cocoon attached to the stem of the food-plant. At rest it does not use the first two pairs of prolegs, curving the body somewhat like the larvae of *Geometridae*. The stout chrysalis resembles that of *Pseudosphinx tetrio*.

Hab. South and Central America; Cuba.

Four species, which bear a close resemblance to each other in pattern and colour, being all grey, with a short, more or less triangular, silvery spot on the forewing, which is generally preceded by a smaller spot. The mesothoracic tegula have a small black spot anteriorly, corresponding to the anterior part of the patch of *Leucorhampha*; the abdomen has no pale dorsal mesial vitta as has *Leucorhampha*; below there is a series of white mesial spots.

Key to the species:

a.	Apex of forewing acute; silvery spot of forewing elongate-triangular, its hinder margin longer than upper . . .	313. *M. pluto*.
	Apex of forewing truncate; silvery spot: its hinder margin (at R^3) shorter than upper; or the spots absent . . .	. . *b*.
b.	Body and wings silvery grey . . .	312. *M. oiclus*.
	Body and wings more or less dark olivaceous-brown	. . *c*.
c.	Brown marginal band SC^5—R^3 of forewing not incised at the veins, two pale oblique lines on disc	314. *M. bubastus*.
	Brown marginal band consisting of half-moons; brown discal and postdiscal lines irregular	315. *M. pseudothyreus*.

312. **Madoryx oiclus.**

Sphinx oiclus Cramer, *Pap. Ex.* iii. p. 39. t. 216. f. c (1779) (Surinam); Goeze, *Ent. Beytr.* iii. 2. p. 226. n. 83 (1780).
Hemeroplanes oiclus, Hübner, *Verz. bek. Schm.* p. 133. n. 1428 (1822); Butl., *Trans. Zool. Soc. Lond.* ix. p. 543. n. 2 (1877); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 8. n. 2 (1881) (Brit. Honduras; Guatemala); Kirby, *Cat. Lep. Het.* i. p. 647. n. 3 (1892) (Surinam); Druce, *l.c. Suppl.* p. 303 (1896) (Orizaba).
Engo oiclus, Walker, *List Lep. Ins. B. M.* viii. p. 115. n. 6 (1856).
Madoryx oiclus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 151. n. 1 (1875) (Cayenne; Surinam).
**Madoryx faunus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 153. n. 4 (1875) (Cayenne;—coll. Charles Oberthür).
Calliomma faunus, Butler, *l.c.* p. 630 (1877); Kirby, *l.c.* p. 646 n. 2 (1892).
Hemeroplanes faunus, Bönninghausen, *Iris* xii. p. 124. n. 46 (1899) (Rio de Janeiro).

♂ ♀. The olive basal band of the forewing is narrow ; the discal silvery spots are nearly of equal size, in most specimens the upper one transverse, the second more or less rounded ; forewing narrower than in the other Continental species. Harpe obtusely pointed (Pl. XLVI. f. 8). Dentate part of penis-sheath (Pl. LIII. f. 18) obtusely acuminate, elongate-ovate, densely denticulated proximally at the right side. White line of palpus interrupted.

Hab. Mexico to Rio de Janeiro.

In the Tring Museum 5 ♂♂, one of them ex coll. Lennep, another from Valencia, Venezuela, a third without locality, two from Costa Rica (M. de Mathan).

The type of *faunus* is in bad condition. The left forewing is much torn at the apex, and the apex of the right one is cut off with a sharp instrument. This accounts for the forewing being described by Boisduval as being less sinuate than in *pluto* and a little truncate at the apex. The posterior silvery spot is nearly as large as in *bubastus*, but its upper inner angle points basad. The penis-sheath is as in *oiclus* ; the harpe and tenth segment are not preserved in the mutilated specimen.

313. **Madoryx pluto.**

Sphinx pluto Cramer, *Pap. Ex.* iii. p. 39. t. 216. f. E (1779) (Surinam) ; Goeze, *Ent. Beytr.* iii. 2. p. 226. n. 85 (1780) ; Chavannes, *Bull. Soc. Vaduise Sc. Nat.* (1854) (larva, pupa).

Hemeroplanes plutonius Hübner, *Verz. bek. Schm.* p. 133. n. 1427 (1822).

Calliomma pluto, Walker, *List Lep. Ins. B. M.* viii. p. 111. n. 3 (1856) (partim) ; Burm., *Descr. Rép. Argent.* v. Atlas p. 33. t. 13. f. 1 (larva). f. 6 (pupa) (1879).

Madoryx pluto, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 152. n. 3 (1875) (Cayenne, Surinam) ; Schaus, *Ent. News* vi. p 141 (1895) (synon.).

**Madoryx deborrei*, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 155. n. 6 (1875) (Brazil ;—Mus. Bruxelles) ; Maass., *Stett. Ent. Zeit.* xli. p. 68 (1880) (= ? *pluto*).

Calliomma ? pluto, Butler, *Trans. Zool. Soc. Lond.* ix. p. 538. n. 1 (1877) (partim).

Hemeroplanes deborrei, Butler, *Trans. Zool. Soc. Lond.* ix. p. 630 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 647. n. e (1892) (Brazil) ; Bönuingh., *Iris* xii. p. 124. n. 45 (1899) (Rio de Janeiro ; distinct from *pluto*).

Calliomma plutonius, Kirby, *Trans. Ent. Soc. Lond.* p. 234 (1877) (synon.) ; id., *Cat. Lep. Het.* i. p. 646. n. 1 (1892) (Brazil).

Hemeroplanes plutotonius (!), Smith, *Trans. Amer. Ent. Soc.* xv. p. 60 (1888).

Hemeroplanes pluto, Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 303. n. 3 (1896) (Jalapa ; Chiriqui).

♂ ♀. The few specimens from Central America and Colombia which we have seen differ from the South Brazilian individuals in the forewing being dentate at SC^5, as is the case in Cramer's figure ; our Surinam specimens, however, have the wing even, like Southern individuals. The lower silvery spot is longer in the Central American and Colombian specimens than in those from the more eastern and southern countries, and the tenth sternite is longer. There are possibly two subspecies.

♂. Tenth sternite longer than in the other species, about twice or thrice the length of the lobes of the tergite. Harpe broadly triangular, somewhat curved upwards. Penis-sheath (Pl. LIII. f. 19) elongate-acuminate, densely spinose at the edges and on the upper surface at the right side and at end, ventro-laterally clothed with spines, which are generally broken off, being very loosely inserted in the membrane of the lateral and ventral apical surface of the penis-sheath.

Larva figured by Chavannes and again by Burmeister, *l.l.c.c.* ; long, somewhat flattened, grey ; head small, thorax somewhat enlarged, seventh segment with

tubercle, horn long in young stages, reduced to a short cone in later stages.—Food-plants: *Jussieua*, *Onagraceae*.

Pupa in a loose, white, muslin-like cocoon, attached to the food-plant.

Hab. Mexico to Bolivia and Southern Brazil.

In the Tring Museum 9 ♂♂, 2 ♀♀ from: Rio Dagua, Colombia (Rosenberg); San Augustin, Mapiri R., Bolivia, 3500 ft., ix. '95 (Stuart); Rio Demerara; St. Catharina; 1 ♂ ex coll. Lennep.

In the Bern Museum from Para (Dr. Goeldi), at the electric light, iii.

314. **Madoryx bubastus.**

Sphinx bubastus Cramer, *Pap. Exot.* ii. p. 84. t. 149. f. E (1777) ("Coromandel" loc. err.); Goeze, *Ent. Beytr.* iii. 2. p. 221. n. 62 (1780).

♂♀. Much more brown than *oiclus*. Upper discal silvery spot of forewing small, rounded or ovate; second irregularly triangular; at least three times the size of the first, its upper inner edge pointing costad; from near the end of SC^5 two pale lines run backwards, forming an acute angle, the outer one ending at tip of M^1, the proximal one at inner margin in a patch, in which are situated two brown spots; it nearly touches in middle a pale discal line which is curved costad in front. Distal margin of forewing less dentate in ♀ than in ♂.

♂. Sexual armature as in *oiclus*, but process of harpe narrower, more conical; penis-sheath (Pl. LIII. f. 16) curved at end, dentate at the edge, with some fine bristles at the tip, upper left angle somewhat produced and acute in *butleri*.

Hab. South and Central America, from British Honduras to Santa Catharina.

There are in the Tring Museum a ♂ and a ♀ of a *Madoryx* which differ from all the specimens of *bubastus* we have seen. They are, unfortunately, without locality. The ♂ has only one very small, yellowish, discal dot, and the ♀ has this dot only very feebly indicated by some paler scales. In the ♀ the subbasal costal dot is almost absent, and the disc is much shaded with scales of a peculiar greenish blue tint, similar to that shown in Cramer's figure; the same tint reappears on the underside in the middle of the costal margin, and also on the disc of the right hindwing. The white dots on the underside of the abdomen are minute in the ♀. The penis-sheath (Pl. LIII. f. 17) differs slightly from that of *bubastus*. The distal margin of the forewing is not distinctly dentate in either of the two individuals. These two specimens belong perhaps to a third local race.

a. M. bubastus bubastus.

Merian, *Metam. Ins. Surin.* t. 39 (1705) (imago, pupa; ? *non* larva).
Sphinx bubastus Cramer, *l.c.*
Sphinx didyma, Gmelin, *Syst. Nat.* i. 5. p. 2381. n. 79 (1790) (partim).
Amplypterus bubastus, Hübner, *Verz. bek. Schm.* p. 133. n. 1431 (1822).
Amplypterus bupastus (!), id., *l.c. Index* p. 24 (182–).
Sphinx parce, Burmeister (*non* Fabricius, 1775), *Abh. Nat. Ges. Halle* p. 63 (1854).
Calliomma bubastus, Walker, *List Lep. Ins. B. M.* viii. p. 112. n. 6 (1856).
Zonilia? bubastus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 144. n. 8 (1875).
**Madoryx lyncus* id., *l.c.* p. 151. n. 2. t. 4. f. 4 (1875) (Cayenne;—coll. Charles Oberthür).
Madoryx bubastus, Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 3[illegible] (1876) (Surinam; description).
Panacra? bubastus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 551. n. 15 (1877) ("Coromandel").
Hemeroplanes lyncus, id., *l.c.* p. 630 (1877); Kirby, *Cat. Lep. Het.* i. p. 647. n. 4 (1892) (Cayenne).
Madoryx oiclus, Burmeister, *Descr. Rép. Argent.* v. *Atlas* p. 33 (1879).
Hemeroplanes bubastus, Kirby, *l.c.* n. 7 (1892) (Surinam); Bönninghausen, *Iris* xii. p. 125. sub n. 46 (1899) (Rio Grande do Sul).

Merian's figure, if it was meant for this insect, is much too grey ; in the silvery spots it agrees, however, better with the present insect than with the grey *oiclus*.

Cramer's figure is, in our opinion, a very bad representation of the present species, described fully by Möschler, *l.c.*, and therefore the name *bubastus* has to be used for this insect. In the interpretation of some of Cramer's figures an elastic conscience is necessary.

Boisduval's *lyncus* is described and figured from an individual (or rather one made up of three), of which the wings, thorax, and head belong to what Möschler describes as *bubastus*, the black-banded abdomen to *Aleuron carinata*, and the palpi to some other Lepidopteron.

♂ ♀. Forewing deeply sinuate below apex, this much produced ; distal edge more or less dentate.

Hab. South America : Ecuador and Venezuela to Santa Catharina.

In the Tring Museum 8 ♂♂, 6 ♀♀ from : Cachabi, Ecuador, xi. '96 (Rosenberg) ; Aroa, Venezuela ; Caripe, Venezuela, i. (Mocquerys) ; St. George's, Guayana, xi. (Ellacombe).

In the Bern Museum from Para (Dr. Goeldi), at the electric light, vi.

b. M. bubastus butleri.

**Aleuron butleri* Kirby, *Trans. Ent. Soc. Lond.* p. 240 (1877) ("West Indies"); Waterh., *Aid Ident. Ins.* ii. t. 140. f. 6 (1883) ; Kirby, *Cat. Lep. Het.* i. p. 645. n. 4 (1892).

♂ ♀. Forewing less sinuate, and black discal band of hindwing narrower than in the preceding ; upper left angle of process of penis-sheath produced, acute.

Kirby gives the West Indies as habitat of this form. The specimen, which is in bad condition, bears however a label "Belise," which probably is meant for Belize, British Honduras.

Hab. British Honduras ?

One specimen in the Dublin Museum.

314. **Madoryx pseudothyreus.**

Callionima oiclus ?, Herrich-Sch., *Corresp. Bl.* p. 57 (1865) (Cuba).

Hemeroplanes pseudothyreus Grote, *Proc. Ent. Soc. Philad.* v. p. 41. t. 41. f. 1 (1865) (Cuba) ; id. & Rob., *ibid.* v. p. 152. n. 22 (1865) ; Grote, *l.c.* vi. p. 328 (1867) (Cuba) ; Herr.-Sch., *Ausser. Schm.* f. 554 (1869) ; Grote, *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (Cuba) ; Gundl., *Contr. Ent. Cubana* p. 182 (1882) (San Christobal, Cuba) ; Kirby, *Cat. Lep. Het.* i. p. 647. n. 5 (1892) (Cuba).

Madoryx pseudothyreus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 156. n. 8 (1875).

Hemeroplanes? pseudothyreus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 543. n. 3 (1877).

♂ ♀. Much more variegated than the other species of *Madoryx*. Olive subbasal patch of forewing small, separated into two spots ; no white subbasal costal dots ; second silvery discal spots angle-shaped, the upper linear, sometimes a white dot upon M at base of M^1 ; discal lines dentate, brown marginal band indented at the veins, above and below. First discal line of underside black, strongly dentate. Penis-sheath (Pl. LIII. f. 15, Cuba) somewhat resembling that of *oiclus*, the dilated part shorter and more acute, dentate only at the edges ; the apex sinuate in our Florida specimens.

Hab. Cuba ; Florida.

In the Tring Museum 3 ♂♂, 3 ♀♀ from Chocoloskee, Florida, xi.

A ♂ in the Berlin Museum, and another in coll. Staudinger, from Cuba.

Herrich-Schaeffer's figure is overdrawn, like the others on the same plate.

XCVI. HEMEROPLANES.—Typus : *pan*.

Sphinx, Fabricius (*non* Linné, 1758), *Syst. Ent.* p. 543 (1775).
Hemeroplanes Hubner, *Verz. bek. Schm.* p. 133 (1822) (partim ; type : *pan*).
Oreus id., *l.c.* p. 136 (1822) (partim ; type : *gnoma*).
Calliomma Walker, *List Lep. Ins. B. M.* viii. p. 108 (1856) (type : *nomius*).
Enyo, id., *l.c.* p. 112 (1856) (partim).
Calliomina (!), Lucas, in Sagra, *Hist. Cuba* vii. p. 681 (1856).
Philampilus (!), Schaufuss, *Nunq. Otios.* p. 19 (1870).
Encheryx Boisduval, *Spec. Gén. Lép. Hét.* i. p. 219 (1875) (type : *parce*) ; Luc., *Bull. Soc. Ent. France* p. 153 (1883) (= *Calliomma*).
Callioma (!), Rothschild, Nov. Zool. i. p. 73 (1894).
Caliomma (!), Bönninghausen, *Iris* xii. p. 123 (1899).

♂♀. Scaling of head raised between antennae. Eye not distinctly lashed. Palpus pointed. Antenna slender, not clubbed, seriated ciliae present in ♀, but short ; end-segment long and slender, gradually narrowed to a point. Body smooth-scaled ; abdominal tergites with a single row of long, strong spines intermingled with small ones ; spines of sternites much weaker ; fan-tail of ♂ three-pointed, ♀ with a long tuft instead. Legs short-scaled, merum of mid- and hind-coxae not angulate ; tarsi slender, cylindrical, with the normal four rows of spines ; midtarsus with comb. Forewing sinuate below apex, D^3 and D^4 of about the same length ; SC^2 and R^1 of hindwing from upper angle of cell, R^2 in or before centre, D^3 longer than D^4, apex acute. Seventh abdominal sternite of ♂ trapezoidal, membranaceous distally, without spines.

♂. Tenth segment divided, the tergite broad, the sternite a narrow belt which is produced into two slender processes (Pl. XLII. f. 16—24 ; XLIII. f. 2. 3). Clasper large, with lanceolate friction-scales ; ventral edge with spines, a patch of spiniform hairs on inner surface near base ; right and left harpe generally not quite the same (Pl. XLVI. f. 11. 17. 18 ; XLVII. f. 7. 8). Penis-sheath without external armature, or with an obtuse apical process, inside with long spines (Pl. LIII. f. 25. 26).

♀. Vaginal orifice mesial, surrounded by ridges and folds ; eighth tergite extended to the ventral side (Pl. XL. f. 18. 19 ; XLI. f. 6).

Early stages : Stoll, in Cram., *Pap. Ex. Suppl.* t. 22. f. 2, figures a larva which he says is that of *H. pan*. It resembles very much an *Isognathus* larva and a younger stage of the larva of *Pseudosphinx tetrio*. Burmeister, *Descr. Rép. Argent.* v. *Atl.* t. 23. f. 1 (1879), figures a similar caterpillar, of which he did not know the imago.

Hab. Florida to Argentina ; West Indies.

Six species.

Key to the species :

a. Hindwing walnut-brown, base buff . . 316. *H. nomius*.
Hindwing ochraceous, with a more or less fuscous distal border . . . . 319. *H. calliomenae*.
Hindwing cinnamon-rufous . . . . . *b*.
b. Apex of forewing pointed . . . . . *c*.
Apex of forewing truncate-sinuate, or truncate . . . . . 317. *H. pan*.

c.	Pale oblique apical line of forewing straight from apex to R^2, here much nearer the costal patch of lunules than outer margin	321. *H. inuus.*
	This line curved, much nearer the distal margin than the discal costal patch . . .	*d.*
d.	Silvery spot of forewing broad behind . .	320. *H. parce.*
	Silvery spot of forewing linear, not dilated behind	318. *H. grisescens.*

316. Hemeroplanes nomius.

**Calliomma nomius* Walker, *List Lep. Ins. B. M.* viii. p. 109. n. 1 (1856) (Brazil;—Mus. Brit.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 539. n. 2 (1877); Druce, in *Biol. Centr. Amer., Lep. Het.* i. t. 3. f. 3 (1883); Kirby, *Cat. Lep. Het.* i. p. 646. n. 3 (1892) (Brazil); Druce, *l.c. Suppl.* p. 301. n. 4 (1896) (Guatemala).

Eucheryx nomius, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 221. n. 2 (1875) (Brazil).

Calliomma (!) *nomius*, Bönningh., *Iris.* xii. p. 123. n. 41 (1899) (Rio de Janeiro).

♂♀. Scaling of mesonotum raised to a prominent hump. Palpus and abdomen longer than in the other species, and the silvery spot of the forewing represented only by a minute dot.

♂. Tenth tergite (Pl. XLII. f. 24, side-view) deeply divided into two lobes, which are parallel, almost vertical, the sinus between them oblong; each lobe acuminate, the upper edge slanting, nearly straight, the lower one strongly convex in middle; sternite (Pl. XLII. f. 23) divided into two long, slender processes which are lying close along the inner surface of the tergal lobes, not being visible in a side-view. Harpe (Pl. XLVI. f. 11) produced into a long, horizontal process which ends in two short points. Penis-sheath narrowed at end into a short, obtuse, curved process (Pl. LIII. f. 26).

Early stages not known.

Hab. Guatemala to Southern Brazil.

In the Tring Museum 5 ♂♂, 2 ♀♀ from: Aroa, Venezuela, iv.; Rio Cachyaco, Prov. Iquitos (Stuart); Espirito Santo; Rio de Janeiro.

317. Hemeroplanes pan.

Sphinx pan Cramer, *Pap. Ex.* iii. p. 39. t. 216. f. D (1779) (Surinam); Goeze, *Ent. Beytr.* iii. 2. p. 226. n. 84 (1780).

Hemeroplanes pan, Hübner, *Verz. bek. Schm.* p. 133. n. 1425 (1822); Kirby, *Cat. Lep. Het.* i. p. 647. n. 6 (1892).

Enyo pan, Walker, *List Lep. Ins. B. M.* viii. p. 118. n. 11 (1856).

Hemeroplanes ? pan, Butler, *Trans. Zool. Soc. Lond.* ix. p. 544. n. 4 (1877) (a *Calliomma*?); Maass., *Stett. Ent. Zeit.* xli. p. 54 (1880).

**Calliomma denticulata* Schaus, *Ent. News* vi. p. 141 (1895) (Jalapa).

Calliomma denticulatum, Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 300. n. 1 (B). t. 68. f. 2 (1896) (Jalapa).

♂♀. We have seen eight specimens of this species. They vary *inter se*, and are doubtless the insect which Cramer's figure was meant to represent. The truncate-sinuate apex of the forewing and the deeply sinuate and denticulate outer margin, the pale triangular costal patch in front of the silvery spot and the smaller costal patch at the subcostal fork, by which this species can be recognised, are characters also found in Cramer's figure. Our specimen from the Rio Cachyaco, the right wing of which is slightly crippled at apex, has the outer margin less denticulated, in front less sinuate, and the apex less produced than the other seven

specimens examined, and the basal area of the wing is not reddish tawny, but almost of the same colour as the outer half; these differences are individual and accidental. The outline of the forewing is also not quite the same in the other examples.

♂. Tenth tergite similar to that of *inuus*, the mesial lobes longer and more acutely pointed; the processes of the sternite less convergent, longer. Harpe (Pl. XLVI. f. 18) reaching beyond middle of clasper, cylindrical, slightly curved, left one acute, right one obtuse. Clasper with a patch of long spines at ventral margin near middle of harpe. Penis-sheath without external armature.

Hab. Mexico to the Upper Amazons, Para and Surinam; probably more widely distributed.

In the Tring Museum 3 ♂♂ from: Rio Dagua, Colombia (W. Rosenberg); Rio Cachyaco, Peru (M. Stuart); Cuzco, Peru.

In coll. Schaus from Jalapa. In coll. Oberthür from Carvallo-Cocho, Amazons, Peru, v.—vii. 1884 (M. de Mathan), 1 ♂. Also in the Oxford Museum. In the Bern Museum from Para (Dr. Göldi), 16. vi. and 16. viii.

318. Hemeroplanes grisescens.

**Calliomma grisescens* Rothschild, Nov. Zool. i. p. 9 (1894) (♀, hab.?;—Mus. Tring); id., *l.c.* ii. t. 9. f. 4 (♀) (1895).

♂♀. Somewhat resembling small specimens of *calliomenae*.——Forewing not dentate, or the teeth vestigial only, strongly concave below apex and more convex in middle than in *calliomenae*; a black band crosses the wing just proximally of the silvery spot.——Hindwing nearly as in *parce*, the black anal mark heavy, the space outside it grey. The ♀ much more grey than the ♂.

♂. Tenth tergite (Pl. XLIII. f. 2. 3) half as long again as broad in a dorsal view, the sides curved downwards, apex broadly sinuate, the lobes very short, a trace of a mesial lobe; sternite concealed by the tergite, divided into two long, slender processes which lie along the inner surface of the tergite. Harpe (Pl. XLVI. f. 17) short, slightly curved upwards at tip; ventral margin of clasper densely spinose. Penis-sheath without external armature.

♀. Vaginal plate similar to that of *inuus* (Pl. XL. f. 19).

Hab. Argentina.

In the Tring Museum 9 ♂♂, 6 ♀♀ from Tucuman.

319. Hemeroplanes calliomenae.

Philampilus (!) *calliomenae* Schaufuss, *Nunq. Otios.* i. p. 19 (1870) (Venezuela).
**Calliomma lutescens* Butler, *Proc. Zool. Soc. Lond.* p. 5. t. 1. f. 5 (1875) (Haiti;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 540. n. 7 (1877); Kirby, *Cat. Lep. Het.* i. p. 646. n. 8 (1892).
Calliomma pan?, Maassen, *Stett. Ent. Zeit.* xli. p. 54 (1880).
Calliomma calliomenae, Kirby, *l.c.* n. 7 (1892).
**Callioma* (!) *ellacombei* Rothschild, Nov. Zool. i. p. 10 (1894) (S. Domingo, *type*; Venezuela;—Mus. Tring); id., *l.c.* ii. t. 9. f. 3 (♀) (1895).

♂♀. A variable insect, recognisable by the denticulated forewing and the yellow, dark-bordered hindwing. The ♀♀ are generally more uniform in colour on the forewing, but possess often a conspicuous discal costal patch of halfmoons, while the ♂♂ are less grey and often strongly mottled with blackish brown. The basal area of the forewing below varies from orange-buff to tawny.

Schaufuss's description of *calliomenae* is quite sufficient to recognise the present species, which is common in Venezuela, from where *calliomenae* came. The West Indian individuals are not specifically different.

♂. Tenth tergite (Pl. XLII. f. 16. 18) broadest proximally in dorsal view, lateral edge first slanting, then horizontal ; apex mesially rounded, laterally triangularly sinuate, the rounded middle lobe feebly incised, the lateral lobes triangular, somewhat curved downwards ; sternite (Pl. XLII. f. 17) with two long processes which are rather broad proximally and are twisted, not visible in dorsal and lateral view. Clasper (Pl. XLVII. f. 7) acuminately sole-shaped, ventral edge spinose, incrassate near the harpe and dilated into a short rounded lobe, which is turned upward ; harpe with a free spoon-shaped process. Penis-sheath without external armature.

♀. Ventral portion of eighth tergite small (Pl. XL. f. 18), connected with the orifice by a fold ; a groove at each side of the orifice.

Hab. Haiti ; Colombia ; Venezuela ; probably more widely distributed.

In the Tring Museum 50-odd specimens from Venezuela: Merida, Aroa, Valencia, Caripe, Maripa (Caura R., vi. 1901, S. Klages) ; 1 ♀ from Haiti ; 2 ♀♀ from Bogota (near the town, March).

320. **Hemeroplanes parce.**

**Sphinx parce* Fabricius, *Syst. Ent.* p. 543. n. 24 (1775) (Brasilia, Mus. Banks ;—Mus. Brit.); Goeze, *Ent. Beytr.* iii. 2. p. 207. n. 15 (1780) ; Fabr., *Spec. Ins.* ii. p. 148. n. 42 (1781) ; id., *Mant. Ins.* ii. p. 96. n. 46 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2382. n. 80 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 372. n. 50 (1793) ; Burm., *Sphing. Bras.* p. 62 (1856).

Sphinx licastus Stoll, in Cram., *Pap. Ex.* iv. p. 180. t. 381. f. A, B (1781) (Surinam) ; Burm., *l.c.* p. 62 (1856) ; Lucas, *Bull. Soc. Ent. France* p. 143 (1883) (= *parce*).

Oreus licastus, Hübner, *Verz. bek. Schm.* p. 136. n. 1465 (1822).

**Sphinx gallianna* Burmeister, *l.c.* p. 6 (1856) (*type* in Mus. Berlin ; descr. mala).

Calliomma lycastus (!), Walker, *List Lep. Ins. B. M.* viii. p. 110. n. 2 (1856) (= *parce* ; partim ; St. Vincent ; St. Domingo) ; Clem., *Journ. Ac. Nat. Sc. Philad.* iv. p. 141. n. 21 (1859) ; Herr.-Sch., *Corresp. Bl.* p. 57 (1865) (Cuba ; dist. from *parce*) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 48 (1865) (Cuba ; =*gallianna* ex err. !) ; id. & Rob., *ibid.* p. 153. n. 29 (1865) (syn. pro parte) ; Grote, *l.c.* vi. p. 328 (1867) (partim) ; id., *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (Cuba) ; Gundl., *Contr. Ent. Cubana* p. 183 (1882).

Calliomma parce, Lucas, in Sagra, *Hist. Cuba* vii. p. 681 (1856) (Cuba).

Callionime (!) *parce*, id., *l.c.* t. 17. f. 3 (1857).

Philampilus (!) *licastus*, Schaufuss, *Nunq. Otios.* i. p. 19 (1870) (Venezuela).

Eucheryx licastus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 220. n. 1 (1875) (= *parce*) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxxi. p. 350 (1876) (= *parce* = *galliana* !).

Calliomma licastus, Butler, *Trans. Zool. Soc. Lond.* ix. 539. n. 3 (1877) (St. Cruz ; St. Vincent ; Haiti ; St. Thomas) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 5. n. 1 (1881) (Brit. Honduras ; Nicaragua ; Chiriqui) ; Kirby, *Cat. Lep. Het.* i. p. 646. n. 4 (1892) ; Druce, *l.c. Suppl.* p. 300 (1896) (Orizaba ; Guatemala ; Costa Rica).

Calliomma parce, Butler, *Trans. Zool. Soc. Lond.* ix. p. 539. n. 4 (1877) (distinct from *licastus*) ; Maass., *Stett. Ent. Zeit.* xli. p. 53 (1880) (= *licastus*).

Calliomma galiana (!) Burmeister, *Descr. Rép. Argent.* v. *Atlas* p. 33 (1879).

Calliomma parcae (!), Kirby, *l.c.* n. 5 (1892) ; Druce, *l.c. Suppl.* p. 300 (1896) (*licastus* probably not distinct from "*parcae*").

Callioma (!) *licastus*, Rothschild, Nov. Zool. i. p. 73 (1894) (Aroa, Venezuela).

Callioma (!) *parcae* (!), id., *l.c.* i. p. 9 (1894) (Aroa, Venezuela).

Caliomma (!) *parce*, Bönninghansen, *Iris* xii. p. 123. n. 40 (1899) (partim ; Rio de Janeiro).

♂ ♀. The pale apical line of the forewing curved, disappearing before R^2 in a pale patch, which curves towards the distal margin, the pale line bordered behind with brown, this border indistinct near apex, widened and black at R^1. Fore- and

hindwing somewhat variable in the depth of the colour above and below; hindwing often shaded with black along distal margin.

♂. Tenth sternite (Pl. XLII. f. 19. 20) not quite symmetrical; tergite carinate mesially, the sides curved downwards, widened towards end, apex triangularly sinuate, the lobes short, each sinuate again, the tips of the sternal processes visible through these sinuses in dorsal view (Pl. XLII. f. 19); sternite with two long slender processes which are curved downward at end. Clasper somewhat acuminate, the ventral margin shallowly concave before end; harpe as in *inuus*, but longer, the spines at the ventral margin of the clasper near the end of the harpe more concentrated to a patch. Penis-sheath (Pl. LIII. f. 25) without external armature.

♀. Vaginal plate (Pl. XLI. f. 6) with the ridge round the small orifice sinuate behind the orifice, two folds on each side joining the raised edge of the orifice at its highest point; tergite (*VIII t*) extended to near orifice.

Early stages not known.

Hab. Florida, West Indies, southwards to Southern Brazil and Bolivia.

In the Tring Museum 90-odd specimens from: Haiti; Florida; Mexico; Honduras; Costa Rica; Colombia; Peru; Bolivia; Venezuela; Rio de Janeiro; Sao Paulo.

321. **Hemeroplanes inuus** spec. nov.

Calliomma lycastus (!), Walker (*non* Stoll, 1782), *List Lep. Ins. B. M.* viii. p. 110. n. 3 (1856) (partim; Rio de Janeiro); Grote, *Proc. Ent. Soc. Philad.* v. p. 48 (1865) (partim); id. & Rob., *ibid.* p. 153. n. 29 (1865) (partim); Grote, *l.c.* vi. p. 328 (1867) (partim).

Calliomma galianna, Butler (*non* Burmeister, 1858), *Trans. Zool. Soc. Lond.* ix. p. 539. n. 5 (1877) (Rio de Janeiro); Kirby, *Cat. Lep. Het.* i. p. 646. n. 6 (1892); Druce, *l.c. Suppl.* p. 300. n. 1 (A) (1896) (Orizaba).

Calliomma ( ) *parce*, Bönninghausen (*non* Fabricius, 1775), *Iris* xii. p. 123. n. 40 (1899) (partim).

♂♀. As pointed out by Grote and others, Burmeister's description is kept in such general terms that it applies very well to both *parce* and the present insect. Burmeister erroneously believed (*lycastus* =) *parce* to be a species without a silvery spot on the forewing. The specimens in the Berlin Museum mentioned by him are *parce*, not the present species, which, therefore, is without a name.

Pale apical line of forewing straight from apex to R^2, here much closer to discal costal patch of buff-coloured halfmoons than to outer margin, which is less convex than in *parce*.

♂. Tenth segment (Pl. XLII. f. 21. 22) very different from that of *parce*; tergite divided into four lobes, the mesial ones long and slender, the lateral ones triangular and short, the tergite flattened; sternite (Pl. XLII. f. 22) with two slender processes which are curved towards each other. Clasper with spines at ventral edge near the harpe; this ending in a slender, curved, obtuse process (Pl. XLVII. f. 8). Penis-sheath without external armature.

♀. Eighth tergite extending close to the vaginal orifice (Pl. XL. f. 19); this with the anterior edge raised.

Hab. Mexico to Southern Brazil and Paraguay.

In the Tring Museum 5 ♂♂, 2 ♀♀ from: Rio Cachyaco, Prov. Iquitos (Stuart), *type*; S. José, Costa Rica (Underwood); Paraguay (Dr. Bohls); Sapucay, near Villa Rica, Paraguay (Foster).

XCVII. STOLIDOPTERA.—Typus : *tachasara*.

Aleuron, Druce (*nom* Boisduval, 1870), *Ann. Mag. N. H.* (6). ii. p. 236 (1888).

♂♀. Head slightly crested. Eye small, lashed. Palpus long, projecting, compressed, the two together acutely triangular. Antenna long and slender, not at all clubbed, hook long and gradual, end-segment short. Spines of abdomen in one row, those of the sternites rather weak, flattened ; those of the posterior tergites long, conical, as in *Leucorhampha* ; seventh sternite of ♀ small, not spinose ; tail short, obtusely triangular in ♂, a single narrow tuft in ♀. Legs short-scaled. Forewing irregularly lobed, apical lobe from SC^4 to R^1, including R^1, the first deep sinus behind this vein ; distal margin of hindwing entire, costal margin enlarged, when the specimen is at rest projecting beyond the costal margin of the forewing and enveloping it, the lobe being recurved so that it lies upon the upperside of the costal area of the forewing ; cell of hindwing broad, D^2 and D^3 straight, oblique, R^2 central, R^3 and M^1 rather close together.

♂. Sexual armature as in *Madoryx* and *Leucorhampha*, the harpe resembling more the type found in *Aleuron*, but symmetrical.

Early stages not known.

Hab. Neotropical Region.

One species.

The genus is as closely allied to *Aleuron* as it is to *Leucorhampha* and *Pachylia*. The enlarged costal marginal area of the hindwing is a peculiar character which reminds one of *Hypaedalia*, *Amorpha populi*, and *Lasiocampidae*. In *Stolidoptera* the frenulum is well developed. This costal area is green on the upperside like the upperside of the forewing, not black like the rest of the upperside of the hindwing.

322. Stolidoptera tachasara.

**Aleuron tachasara* Druce, *l.c.* (1888) (Chiriqui ;—coll. Staudinger) ; Kirby, *Cat. Lep. Het.* i. p. 645. n. 2 (1892) ; Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 302. n. 1 (A). t. 65. f. 7 (♀) (1896) (Orizaba ; Chiriqui).

♂♀. Our Venezuelan specimens are larger than those from Panama ; the forewing of our largest ♀ measures 51 mm., of our largest ♂ 44 mm.

♂. Tenth segment similar to that of *Leucorhampha ornatus* (Pl. XLIII. f. 1), but the sternite and tergite not contiguous ; the lobes of the tergite triangular, the processes of the sternite suddenly hooked at end. Clasper long ; harpe conical, regularly curved upwards (Pl. XLV. f. 29) ; right and left harpes the same. Penis-sheath (Pl. LIII. f. 22) of the type of *Madoryx oiclus*, the projecting dorsal apical broad lobe dentate at the edge, asymmetrical.

♀. Vaginal plate large, obtusely rounded, rather strongly chitinised ; orifice in a large proximal cavity ; no special armature.

Hab. Mexico to Venezuela.

In the Tring Museum 5 ♂♂, 2 ♀♀ from : Chiriqui ; Merida (Briceno), iv.

XCVIII. PROTALEURON gen. nov.—Typus : *rhodogaster*.

♂. Head crested. Eye lashed. Palpus very large, rounded in lateral aspect, first segment convex laterally at apex, second bulbous at outer apical angle as in

Aleuron. Antenna long and slender, reaching beyond end of cell of forewing ; end-segment compressed like the preceding, triangular, about three times as long as vertically broad at base. Thorax not crested. Spines of abdomen : those of posterior tergites long and very strong ; of proximal tergites much weaker and more numerous, with small flat ones covering the longer ones ; those of sternites also long, conical, single, thin ; end of abdomen not distinctly tufted. Legs smoothly scaled, long ; spurs of hindtibia rather short, with a tuft between the two pairs ; no tarsal comb. Forewing irregularly dentate ; costal margin of hindwing normal, anal angle not projecting, cell short, lower angle acuminate, D^3 being very oblique, R^2 before centre, D^3 much longer than D^4.

♂. Sexual armature of the type of *Madoryx*, symmetrical ; harpe vestigial ; friction-scales very small and numerous.

Early stages not known.

Hab. South America.

One species.

A connecting link between *Aleuron* and *Madoryx*, *Pachylia*, etc. Nearest to *Stolidoptera*, but easily distinguished by the absence of the costal lobe of the hindwing, the shape of the palpus, etc.

323. **Protaleuron rhodogaster** spec. nov. (Pl. V. f. 18, ♂).

♂. Body above greenish olive ; beneath pinkish crimson, inclusive of palpi and femora ; scaling of antennae pinkish buff, legs buff ; abdomen with deeper olive lateral patches on proximal segments, apex of these segments laterally creamy.

Wings, *upperside*.——Forewing like thorax ; three antemedian and three discal lines, distinct at hinder margin, where they are blackish, the third discal one reappearing at R^2, where the second is also a little more distinct ; a small black stigma ; an indistinct oblique apical line ending behind SC^5 in a black spot ; bluish white scales proximally of antemedian lines and distally of discal ones, also between the lines at hinder margin ; apex pointed, distal margin sinuate between SC^1 and R^3, dentate.——Hindwing olive-brown, greyish olive at base ; distal margin convex, anal angle broadly rounded, small teeth at tips of posterior veins.

Underside.——Forewing olive-brown in basal two-thirds, washed with clay-colour, disc crimson coral-red, with traces of lines ; a very irregular marginal band, brown, washed with red, widest before R^2, deeply incised at R^3, M^1, and M^2.——Hindwing : pinkish crimson from costal margin beyond cell ; abdominal area olive clay-colour ; distal marginal band brown washed with red, less distinct than on forewing, triangularly dilated at R^2.

♂. Tenth segment as in *Stolidoptera* (Pl. XLIII. f. 1), but the processes of the sternite less curved at end Clasper very large ; harpe vestigial, without free process (Pl. LIX. f. 6). Penis-sheath (Pl. LIX. f. 8) large, with a stronger chitinised and strongly dentate broad flap or plate on each side ; apical edge also incrassate, and armed with some teeth.

Hab. Ecuador.

One ♂ in the Oxford Museum.

There is nothing known with which this species could be confounded.

XCIX. ALEURON.—Typus: *carinata*.

Sphinx, Perty (*non* Linné, 1758), *Del. Anim. Art.* (1834).
Enyo, Walker (*non* Hübner, 1822), *List Lep. Ins. B. M.* viii. p. 112 (1856) (partim).
Calliomma, Clemens (*non* Walker, 1856), *Journ. Ac. N. Sc. Philad.* iv. p. 142 (1859).
Aleuron Boisduval, *Cons. Lép. Guatemala* p. 71 (1870) (type: *carinata*).
Tylognathus Felder, *Reise Novara, Lep.* t. 75 (1874) (*nom. indescr.*).
Callemyo Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 279 (1874) (type: *chloroptera*).
Gonenyo Butler, *Trans. Zool. Soc. Lond.* ix. p. 543 (1877) (type: *carinata*).

♂♀. Palpus large, prominent, first segment slightly, second more or less distinctly angulate laterally at apex, third very small. Head and thorax with a mesial crest. Eye small, lashed. Antenna long, reaching beyond apex of cell in ♂, slender, not clubbed, gradually narrowed to a long hook, end-segment short. Hindmargin of merum of mid- and hindcoxa not angulate. Abdominal spines at the edges of the segments weak, elongate, those on the sternites especially weak, partly modified to scales; seventh sternite of ♀ trapezoidal, its apex not membranaceous and not spinose. Tarsi slender, hindtarsus at least half as long again as cell of hindwing measured along SC; midtarsus with comb—*i.e.*, the proximal spines of the fourth row somewhat prolonged and thin. Distal margin of forewing irregular, sinuate or lobed at apex, lobed or angulate at R^3; SC^2 and R^1 of hindwing from upper angle of cell, R^2 central or below centre of cell, D^2 transverse, D^3 oblique, lower angle of cell acute, D^4 about half the length of D^3 or not much shorter than D^3.

♂. Ninth tergite asymmetrical, more or less twisted. Tenth tergite flat, hairy, apically truncate or sinuate, about four times as long as broad in middle (Pl. XLIII. f. 4. 5); sternite much longer than tergite, curved downwards, produced into a long, sharp point, edges of proximal half somewhat raised, especially in middle of segment; this single process is the result of asymmetrical development. Claspers large, not quite symmetrical; a patch of numerous small friction-scales; harpe of right and left side unequal, the right one the longer, the left produced into a long, cylindrical, distally acuminate process (Pl. XLVI. f. 9), or the left process reduced, the right one always prolonged (Pl. XLVI. f. 12. 13). Penis-sheath ending in a short dentate process, or cariniform at end (Pl. LIII. f. 21. 23. 24. 37).

♀. Vaginal orifice in a large cavity.

Early stages not known.

Hab. Tropical and Subtropical America, exclusive of the West Indies, from Mexico to Southern Brazil.

Seven species.

The obliteration of the left process of the tenth sternite of the ♂ and the asymmetry of the ninth tergite are peculiar features to which we have referred in the Introduction.

Key to the species:

a. Abdomen with black belts . . . . . *b*.
Abdomen without black belts . . . . . *c*.

b. Palpus very strongly angulate, no white discal line on forewing . . . . 324. *A. carinata*.
Palpus feebly angulate, a white discal line outside subcostal fork . . . . 326. *A. cymographum*.

c.	Hindwing with costal lobe ; no prominent black median band on forewing	*d.*
	Hindwing without costal lobe ; a black median band of lines on hindwing	*e.*
	Hindwing without costal lobe ; forewing with a white triangular spot before base of R^1	325. *A. ypanemae.*
d.	Forewing with lobe at M^1. . . .	328. *A. prominens.*
	Forewing with small tooth at M^1, brown below in middle	327. *A. chloroptera.*
e.	Forewing above with two white lines at proximal side of discal band. . .	329. *A. iphis.*
	Forewing above with one white line at proximal side of discal band. . .	330. *A. neglectum.*

324. Aleuron carinata.

*♂. *Enyo carinata* Walker, *List Lep. Ins. B. M.* viii. p. 117. n. 9 (1856) (Para ;—Mus. Brit.).

Aleuron chloroptera, Boisduval (*non* Perty, 1834), *Cons. Lép. Guatemala* p. 71 (1870) (partim ; Para ; "Guatemala" *haec spec.?*) ; id., *Spec. Gén. Lép. Hét.* i. p. 206. n. 3 (1875) (partim ; Cayenne ; Para) ; Butl., *Trans. Zool. Soc. Lond.* ix. p 542. n. 1 (1877) (sub synon.) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 7. n. 1 (1881) (partim) ; Kirby, *l.c.* p. 645. n. 1 (1892) (partim).

*♀. *Tylognathus philampeloides* Felder, *Reise Novara, Lep.* t. 75. f. 11 (1874) (Amazons ;—Mus. Tring) ; Butl., *l.c.* p. 543. n. 2 (1877).

*♀. *Aleuron orophilos* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 205. n. 1 (1875) (Brazil ;—coll. Charles Oberthür) ; Burm., *Descr. Rép. Argent.* v., *Atlas* p. 28. t. 10. f. 4 (1878) (♀, "♂" *ex err.*!) ; Kirby, *l.c.* p. 646. n. 2 (1892) (Brazil) ; Bönningh., *Iris* xii. p. 130. n. 63 (1899) (Rio de Janeiro).

♂. *Aleuron carinatum*, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 206. n. 2 (1875) (Para).

Aleuron philampeloides, id., *l.c.* i. p. 208. n. 6 (1875) (Amazons ; Cayenne) ; Kirby, *Cat. Hep. Let.* i. p. 645. n. 9 (1892).

Gonenyo carinata, Butler, *l.c.* ix. p. 543 (1877) (Para) ; Druce, *l.c.* p. 8. n. 1 (1881) (Chiriqui) ; Kirby, *l.c.* p. 645. n. 1 (1892) (S. America) ; Druce, *l.c. Suppl.* p. 303 (1896) (Belize).

Tylognathus carinatus, Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 349. t. 4. f. 33 (1877) (Surinam).

Callenyo carinata, Grote, *Canad. Ent.* ix. p. 131 (1877).

♂♀. The sexes differ in the pattern of the forewing, the ♂ possessing nine more or less evenly dentate lines between the base of M^2 and outer margin, while these lines are very weak in the ♀, except a submedian and a discal one, these, however, not being dentate but straight, parallel, and prominent. Boisduval's *chloroptera* is the ♂, his *orophilos* the ♀, of *carinata*. He described the same insect also as *carinatum* and *philampeloides*. This is worse than Walker.

The second segment of the palpus is very strongly angulate, much more so than in the other species ; the same character is found again in *Unzela*. The projection is much longer in the ♂ than in the ♀ ; the first segment is also distinctly angulate laterally at apex in ♂, slightly convex in ♀. All the abdominal segments have black bases, but these are not visible when the segments are telescoped into one another, except the two first belts, which are broader.

♂. Tenth segment resembling that of *chloroptera*, but rather longer, the tergite gradually and slightly narrowed to end, this less sinuate. Clasper with rather small friction-scales, which are concealed in a ventral view by a crest of somewhat prolonged ordinary scales ; harpe similar to that of *chloroptera*, produced into a long, tapering, conical, horizontal process which is slightly curved, the process of the right clasper longer, that of the left one shorter, than the clasper, and rather more

curved than the right process. Penis-sheath (Pl. LIII. f. 37) ending in a triangular, straight, dentate process.

Hab. British Honduras southward to Bolivia and Rio de Janeiro ; its range extends doubtless farther north.

In the Tring Museum 6 ♂♂, 5 ♀♀ from : S. Augustin, Mapiri R., 3500 ft., ix. '95 (Stuart) ; Perené R., Peru, iii. (Simons) ; R. Cachyaco, Prov. Iquitos (Stuart) ; Amazons (Bates) ; Chiriqui ; Maripa, Caura R., Venezuela, vi. xii. (S. Klages) ; R. Demerara.

325. **Aleuron ypanemae.**

**Tylognathus ypanemae* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 295. n. 4 (1875) (Ypanema;—coll. Charles Oberthür) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 632 (1877).
Aleuron ypanemae, Kirby, *Cat. Lep. Het.* i. p. 645 n. 5 (1892).

♂♀. Recognisable by the triangular semi-transparent white spot situated in the angle between SC^5 and R^1 of forewing. Behind this spot there is a white linear spot.——Hindwing reddish brown, with an irregularly dentate olive-brown border.

Hab. Brazil.

In the collection of Charles Oberthür from Petropolis, May 1885 (P. Germain) ; Curaça, Brazil, second half of 1884 (P. Germain) ; besides the *type*.

326. **Aleuron cymographum** spec. nov.

♂. As large as *carinata*. Second palpal segment *feebly* angulate. Abdomen with *black* segmental bands similar to those of *carinata*.

Wings, *upperside*.——Forewing : olive-green, with clayish grey shades ; some indistinct undulating lines in basal half nearly as in *chloroptera* ; a minute black stigma ; a dark shade beginning at costal margin in front of apex of cell and ending at distal margin between R^3 and M^1 ; some indistinct lines in outer half of wing, one situated just outside subcostal fork bordered with a sharply marked, undulating *white* line, which stops at the dark oblique shade ; marginal tooth R^3 more prominent than in *chloroptera*, inner margin more concave.——Hindwing resembling that of *carinata*, the blackish discal band-like area widening in front and broadly joining the blackish distal border.

Underside.——Forewing : a sharply defined black discal area, sinuate proximally, not entering the cell, but dilated basad behind cell.——Hindwing with the costal margin slightly convex near base, but not lobed ; a line just outside cell and two dentate ones on disc greenish, more or less accentuated by vein-dots.

Hab. Bolivia.

Two specimens in coll. Staudinger from Rio Songo (Garlepp).

The white line on the forewing distinguishes this species from all the others.

A. cymographum agrees with *carinata* in the colour of the abdomen, but it has not the strongly angulated palpi.

327. **Aleuron chloroptera.**

Sphinx chloroptera Perty, *Del. Anim. Art.* p. 155. t. 31. f. 3 (1834) (Bras. australis ;—Mus. Wien).
Enyo chloroptera, Walker, *List Lep. Ins. B. M.* viii. p. 118. n. 10 (1856) (Honduras).
Aleuron chloroptera, Boisduval, *Cons. Lép. Guatemala* p. 71 (1870) (partim) ; id., *Spec. Gén. Lép. Hét.* i. p. 206. n. 3 (1875) (partim ; Honduras) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 542. n. 1 (1877) (Honduras) ; Burm., *Descr. Rép. Argent.* v., *Atlas* p. 29 (1879) (partim ; Buenos Ayres) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 7. n. 1 (1881) (Nicaragua ; Chiriqui) ; Kirby, *Cat. Lep. Het.* i. p. 645. n. 1 (1892) ; Druce, *l.c. Suppl.* p. 302 (1896) (Mexico ; Brit. Hond.).

Callenyo chloroptera, Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 279 (1874) (below Santarem, June).
Aleuron smerinthoides, Boisduval, *l.c.* p. 207. n. 4 (1875); Kirby, *l.c.* n. 7 (1892) (partim); Bönningh., *Iris* xii. p. 130. n. 65 (1899) (Rio de Jan.).
Aleuron disis Boisduval, *l.c.* p. 207. sub n. 4 (1875).
Tylognathus chloroptera, Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 349. t. 4. f. 34 (1877) (Surinam).

Perty's figure is bad; the description applies doubtless to this species, not to *smerinthoides*, as the underside of the forewing is said to be brown in the middle. The dirty-green colour changes easily into ochraceous; in Perty's figure the forewings are of this colour. Boisduval's description of *smerinthoides* is based on a tawny specimen of *chloroptera*. The sexes are similar, but the space between the antemedian and discal lines is on the whole broader in the ♀ than in the ♂, and the lobe of the costal margin of the hindwing is rather more prominent in the ♂.

♂. Tenth tergite with the sides concave, apex sinuate, lobes rounded; sternite about twice as long as the tergite, curving downward, sharply pointed, margin elevate in middle (Pl. XLIII. f. 4. 5). Right harpe just reaching to end of clasper; left harpe shorter (Pl. XLVI. f. 9): both cylindrical, acuminate, horizontal, not much curved; clasper straight above, rounded below and at apex; patch of friction-scales distinct. Penis-sheath (Pl. LIII. f. 21) with a short, obtuse, apical process which is densely dentate at the end on the upperside.

♀. Vaginal plate small, trapezoidal, apical edge somewhat angled in middle; orifice in a large cavity covered in front and at the sides by a high, thin ridge.

Early stages not known.

Hab. Nicaragua to Southern Brazil and Argentina.

In the Tring Museum 21 ♂♂, 8 ♀♀ from: Honduras; Costa Rica; Rio Cachyaco, Prov. Iquitos (Stuart); Perené R., Peru, iii. (Simons); San Angustin and Guanay, Mapiri R., Bolivia, viii. ix. (Stuart); Maripa, Caura R., Venezuela, ix. 1901 (Klages); Amazons (Bates); Rio de Janeiro; Sao Paulo; Paraguay.

328. Aleuron prominens.

**Enyo prominens* Walker, *List Lep. Ins. B. M.* viii. p. 115. n. 4 (1856) (Brazil;—Mus. Oxford).
**Tylognathus smerinthoides* Felder, *Reise Novara, Lep.* t. 82. f. 5 (1874) (Amazons); Butl., *l.c.* p. 542. n. 1 (1877).
**Aleuron pudens* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 207. n. 5 (1875) (Brazil;—coll. Oberthür); Butl., *l.c.* ix. p. 630 (1877); Kirby, *l.c.* n. 8 (1892); Bönningh., *Iris* xii. p. 130. n. 64 (1899) (Rio de Jan.).
Aleuron prominens, Butler, *l.c.* ix. p. 542. n. 3 (1877); Kirby, *l.c.* p. 645. n. 6 (1892).
Aleuron chloroptera, Burmeister, *Descr. Rép. Argent.* v., *Atlas* p. 29 (1879) (partim).
Enyo promiscus (!), id., *l.c.*

♂♀. Differs from *chloroptera* in the following points:

Forewing with a rounded lobe at M^1 besides the lobe R^3, no tooth at M^2, hinder angle, therefore, more rounded; a spot of white scales behind costal margin about midway between fork and apex, a larger submarginal patch of similar upper scales between R^1 and R^3, both spots not very distinct. Black border of hindwing dentate before R^2, and more or less also between R^3 and M^2, almost vanishing behind M^1, here replaced by the ground-colour of the wing. Distal margin sinuate before anal angle. Forewing below without blackish discal area.

♂. Process of penis-sheath thinner, somewhat triangular, twisted, dentate only at edge. Clasper with short friction-scales, which are concealed in ventral view by a crest of prolonged ordinary scales as in *carinata*.

Hab. Brazil.

In the Tring Museum 1 ♂, 2 ♀♀ from: Amazon (Bates, *type* of *smerinthoides*); Petropolis.

Agrees in the outline of the outer margin of the forewing with *carinata*.

329. **Aleuron iphis** (Pl. LXVI. f. 7, ♂).

**Engo iphis* Walker, *List Lep. Ins. B. M.* viii. p. 116. n. 8 (1856) (Brazil; Mus. Brit.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 542. n. 2 (1877) (partim); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 7. n. 2 (1881) (partim); Kirby, *Cat. Lep. Het.* i. p. 645. n. 3 (1892) (partim); Druce, *l.c. Suppl.* p. 303 (1896) (partim).

Calliomma volatica Clemens, *Journ. Acad. N. Sci. Philad.* iv. p. 142 (1859) (Brazil); Kirby, *l.c.* p. 647. n. 8 (1892).

**Tylognathus scriptor* Felder, *Reise Novara, Lep.* t. 82. f. 4 (1874) (Amazons;—Mus. Tring).

Tylognathus iphis, Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 349 (1887) (partim).

Unzela iphis, Bönninghausen, *Iris* xii. p. 134. n. 75 (1899) (Rio de Janeiro).

This and the following species resemble one another so closely that it is no wonder they are generally treated as being the same. Some of the distinguishing characters have been noticed, but these differences were considered to be due to individual variability of *iphis*. A long series of specimens of the two species, neither of which is rare in collections, has proved to us that the distinguishing characters are constant and that there are no intergradations. As the two insects occur together apparently everywhere within their whole range, and further as the differences in colour are accompanied by differences in the genital armature, the insects are not individual, seasonal, or geographical varieties, but must be specifically distinct.

♂♀. Forewing crossed in middle by four black lines, the most proximal one bordered with white proximally and distally. Underside of forewing with walnut brown discal patch which is contiguous with the cell between R^1 and M^1 and extends basad posteriorly. White belt at base of abdomen conspicuous, the following tergite brownish. Palpus slightly angulated laterally.

♂. Tenth segment essentially as in *chloroptera*; tergite slightly narrowed to end, which is truncate, with the angles rounded. Clasper large, right one larger than the left one; right harpe reaching beyond tip of clasper, curved upwards, pointed, round, like an elephant's tusk; left harpe (Pl. XLVI. f. 10) short, ending in a short pointed process; both claspers with a large patch of dark bristles on the inner surface. Penis-sheath (Pl. LIII. f. 24) with a short process which is densely denticulated.

♀. Vaginal orifice in a large cavity, of which the anterior and lateral walls are formed by a high and thin ridge.

Early stages not known.

Hab. Mexico to Southern Brazil.

In the Tring Museum 13 ♂♂, 6 ♀♀ from: Rio Cachyaco, Prov. Iquitos (Stuart); Perené R., Peru, iii. (Simons); San Augustin, Mapiri R., Bolivia, 3500 ft., ix. (Stuart); Maripa, Canra R., Venezuela, xii. 1901 (Klages); Brit. Guiana; Amazons; Espirito Santo; Rio de Janeiro; Sao Paulo.

330. **Aleuron neglectum** spec. nov. (Pl. LXVI. f. 11, ♂

Aleuron iphis, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 295. n. 3 (1875) (Cayenne); Butl., *Trans. Zool. Soc. Lond.* ix. p. 542. n. 2 (1877) (partim); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 7. n. 2 (1881) (partim); Kirby, *Cat. Lep. Het.* i. p. 645. n. 3 (1892) (partim); Druce, *l.c. Suppl.* p. 303 (1896) (partim).

Tylognathus iphis, Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 349 (1887) (partim).

♂♀. Differs from *iphis* as follows : white belt at base of abdomen much narrower, the following tergite not brown ; black median lines of forewing indistinct behind, except first, which is bordered white proximally, not distally, except at costal margin ; distal patch of forewing below almost black, smaller than in the preceding species, generally not touching the cell, at least not between R^3 and M^1, there being always a spot of the ground-colour at the base of the cellule R^3—M^1.

♂. Tenth sternite rather shorter than in *iphis* and a little more curved. Left harpe (Pl. XLVI. f. 12) obtuse ; right one (Pl. XLVI. f. 13) more strongly curved and rather longer than in *iphis*. Penis-sheath compressed distally (Pl. LIII. f. 23) the cariniform part ending in a point and bearing a few teeth.

Hab. Mexico to Bolivia and Southern Brazil. *Type* (♂) from R. Cachyaco.

In the Tring Museum 13 ♂♂, 4 ♀♀ from : Jalapa, Mexico, vi. (Schaus) ; Costa Rica (Underwood) ; Rio Cachyaco, Prov. Iquitos (Stuart) ; San Augustin, Mapiri R., Bolivia, 3500 ft., ix. (Stuart) ; Maripa, Caura R., Venezuela, iii. (Klages); Rio Demerara ; Bauru, Sao Paulo (Dr. Hempel) ; St. Catharina.

C. ENYO.—Typus : *japix*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Ex.* i. p. 137 (1776).
Setia, Oken, *Lehrb. Naturg.* iii. 1. p. 750 (1815) (*Sesia* emend.).
Enyo Hübner, *Verz. bek. Schm.* p. 132 (1822) (partim ; type : *japix*).
Unzela Walker, *List Lep. Ins. B. M.* viii. p. 161 (1856) (type : *japix* = *discrepans*).
Thyreus, Schanfuss (*non* Swainson, 1821), *Nunq. Otios.* i. p. 20 (1870).
Cornipalpus Felder, *Reise Novara, Lep.* t. 82 (1874) (*nom. indescr.*).
Tylognathus Boisduval, *Spec. Gén. Lép. Hét.* i. p 293 (1875) (partim).

♂♀. Differs from *Aleuron* in the tibiae being spinose.

Early stages not known.

Hab. Tropical and Subtropical America, exclusive of the West Indies, from Mexico to Southern Brazil.

Two species, which have both the first and second segments of the palpus strongly angulated, and the third rather prominent.

Forewing with dark olive median band, interrupted in front	331. *E. japix*.
Forewing with only the triangular costal patch of the median interspace dark olive . . .	332. *E. pronoë*.

331. **Enyo japix.**

Sphinx japix Cramer, *Pap. Ex.* i. p. 137. t. 87. f. c (1776) ("N. York" err. loci) ; Goeze, *Ent. Beytr.* iii. 1. p. 220. n. 55 (1780) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 192 (1865) (not found in U.S.A.).
Enyo japix, Hübner, *Verz. bek. Schm.* p. 132. n. 1416 (1822).
Unzela? japyx (!), Walker, *List Lep. Ins. B. M.* viii. p. 162. n. 2 (1856) ; Clem., *Proc. Ac. N. Sc. Philad.* iv. p. 134. n. 11 (1859) ; id., in Morris, *Syn. Lep. N. Am.* p. 155. n. 1 (1862).
Thyreus japix, Schaufuss, *Nunq. Otios.* i. p. 20 (1870) (Venezuela).
Tylognathus japyx (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 293. n. 1 (1875) (Brazil ; Surinam).
Unzela japix, Kirby, *Cat. Lep. Het.* i. 641. n. 1 (1892) (America).

♂♀. The median band of the forewing is straight proximally, incised at M^2 distally and interrupted between R^1 and costal margin ; it is variable in width and fades often into tawny olive. The first abdominal tergite has a white fringe resembling that of *Aleuron iphis* and *neglectum*.

♂. Sexual armature of the same type as in *Aleuron*; tenth tergite rounded-truncate at end (Pl. XLIV. f. 7); sternite not quite twice the length of the tergite, less slender than in *Aleuron iphis*. Clasper irregularly halfmoon-shaped, dorsal margin concave, ventral one rounded, apex very obtuse; left harpe (Pl. XLVI. f. 5) much shorter, right one longer than the respective clasper, both of the same type as in *Aleuron chloroptera*, and both with a large patch of stiff hairs near the base. Penis-sheath (Pl. LIII. f. 39) ending in a broad, non-dentate lobe.

♀. Vaginal plate broadly rounded; orifice in a large cavity.

Hab. Mexico to Southern Brazil.

Two subspecies:

a. E. japix japix.

Sphinx japix Cramer, *l.c.*

Unzela japyx (!), Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 351 (1877) (Surinam).

Unzela japix, Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 4. n. 1 (1881) (Chiriqui); id., *l.c. Suppl.* p. 300 (1896) (synon. excl.; Mexico; Belize; Panama).

♂♀. Cramer's figure represents the northern form, in which the posterior part of the median band of the forewing is relatively broad, and the middle part more or less rounded distally. Lobe of penis-sheath narrow.

Hab. Mexico to the Amazon region, probably southward to Bolivia.

In the Tring Museum 9 ♂♂, 9 ♀♀ from: Jalapa, Mexico, vi. (Schaus); Rio Cachyaco, Prov. Iquitos (Stuart); Perené R., Peru, iii. (Simons); San Augustin, Mapiri R., Bolivia, ix. (Stuart); R. Demerara; Trinidad.

b. E. japix discrepans.

**Unzela discrepans* Walker, *List Lep. Ins. B. M.* viii. p. 161. n. 1 (1856) (Rio de Jan.;—Mus. Brit.).

Unzela japix, Butler, *Trans. Zool. Soc. Lond.* ix. p. 535 (1877) (Rio de Jan.).

**Cornipalpus succinctus* Felder, *Reise Novara, Lep.* t. 82. f. 6 (♂) (1874) (America;—Mus. Tring).

Unzela japyx (!), Bönninghausen, *Iris* xii. p. 134. n. 74 (1899) (Rio de Jan.).

♂♀. The individuals from Southern Brazil are fairly constantly different in several points: the posterior portion of the median of the forewing is narrower than in the preceding subspecies, being in the ♀ not wider than in the ♂ of the latter; the broad median portion is more sharply angulated distally, and the third white line outside the posterior portion of the band is more proximal, the triangular tawny olive patch situated at inner margin proximally of angle therefore larger than in northern individuals. Lobe of penis-sheath very short and broad.

Hab. Southern Brazil: Espirito Santa to Santa Catharina.

In the Tring Museum 10 ♂♂, 6 ♀♀ from: Espirito Santo; Rio de Janeiro.

332. **Enyo pronoë.**

**Unzela pronoë* Druce, *Ann. Mag. N. H.* (6). xiii. p. 168 (1894) (Belize; Chiriqui;—coll. Druce); id., in *Biol. Centr. Amer., Lep. Het.* i. p. 300. n. 2. t. 66. f. 1 (♂) (1896) (Belize; Honduras; Chiriqui).

**Unzela variegata* Rothschild, Nov. Zool. iii. p. 23. n. 5 (1896) (Bolivia;—Mus. Tring).

♂♀. The figure in the Biologia, *l.c.*, is not very exact. This species is easily recognised by the median interspace of the forewing being much paler than the triangular discal costal patch; the median interspace is also not sharply incised at M^2, but rounded-sinuate.

♂. Tenth tergite as in *japix*; sternite much longer and slenderer. Claspers large, left one evenly rounded at end, right one slightly curved upwards; right

harpe longer than clasper, similar to that of *japix*; left one (Pl. XLVI. f. 6) short, ending in a short, somewhat clubbed process, or the process sinuate at end. Penis-sheath (Pl. LIII. f. 38) with a flat, twisted process, the right edge of which is obtusely dentate, the teeth being continued as folds on the surface of the process.

Hab. Honduras to Bolivia and Sta. Catharina.

Two subspecies :

a. E. pronoë pronoë.

**Unzela pronoë* Druce, *l.l.c.c.*
**Unzela variegata* Rothschild, *l.c.*

♂ ♀. Hindwing pale, semitransparent, except distally and posteriorly. Tenth sternite of ♂ almost three times the length of the tergite.

Hab. Honduras to Bolivia and Para.

In the Tring Museum 5 ♂♂, 1 ♀ from : Chiriqui ; Para ; S. Augustin, Mapiri R., Bolivia, ix. (Stuart) ; La Union, Caura R., Venezuela, vi. '02 (Klages).

b. E. pronoë fuscatus subsp. nov.

Unzela spec., Bönninghausen, *Iris* xii. p. 134 (1899) (S. Catharina).

♂. Hindwing brown, the semitransparent area reduced to a streak in cell and another behind it ; underside of body more clayish, and the discal costal patch of forewing above smaller, than in the northern form. Tenth sternite a little more than twice the length of the tergite ; left harpe sinuate, upper lobe acute.

Hab. Sta. Catharina.

In the Tring Museum 1 ♂ (*type*) from Sta. Catharina.

CI. EPISTOR.—Typus : *lugubris.*

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Enyo Hübner, *Verz. bek. Schm.* p. 132 (1822) (partim ; type : *japix*) ; Walk., *List Lep. Ins. B. M.* viii. p. 112 (1856).
Thyreus, Harris (non *Swainson*, 1821), in Sillim., *Journ. Sc. Art* xxxvi. p. 306 (1839) (partim).
Pterogon, Burmeister (*non* Boisduval, 1834), *Sphing. Bras.* p. 72 1856).
Epistor Boisduval, *Spec. Gén. Lép. Hét.* i. p. 296 (1875) (type : *lugubris*).
Triptogon Ménétries, *Enum. Corp. Anim. Mus. Petr., Lep. Suppl.* ii. p. 94 (1857) (partim ; *nom. indescr.*) ; Kirby, *Cat. Lep. Het.* i. p. 644 (1892).

♂ ♀. Palpus smoothly scaled, closely appressed to head, apex of both together rounded in dorsal view, third segment small, with a pale tip. Eye large, not distinctly lashed. Antenna feebly or more distinctly incrassate towards hook, this long, sharply curved, tip generally pointing basad ; end-segment very short, flattened ventrally or excavate, with a brush of long scales dorsally and apically. Mesothorax with a high mesial crest, which is highest in front. Spines of abdomen narrow, weak ; ♂ with apical tripartite fan, mesial brush narrow and prolonged ; ♀ without fan-tail, seventh segment conical, sternite small, membranaceous apically. Midtarsus with comb ; scaling of hindtibia of ♂ prolonged dorsally and ventrally, the tibia appearing compressed ; hindtarsus with four rows of spines, with very few additional spines. Apex of forewing sinuate or truncate.

♂. Tenth tergite (Pl. XLIV. f. 10. 11. 12) long, narrow, produced into a pointed apical process and bearing three large, pointed, ventral, vertical teeth ; sternite also narrow, flat, horizontal, slightly dilated at end, the dilated part asymmetrical.

Clasper ending in a process, or acuminate, with small and numerous friction-scales; armature different in most species (Pl. XLVII. f. 16—19). Penis-sheath either with practically no armature, or ending in a long apical process (Pl. LIII. f. 32. 33).

♀. Vaginal plate small, rounded; orifice a narrow transverse slit, placed somewhat towards the left side.

Larvae not sufficiently known, figured of *lugubris* and *ocypete*.—Food-plants: *Vitis*, *Citrus*, etc.

Pupa: cylindrical, glossy; head rounded; labrum terminal; tongue-case not carinate; head and thorax not punctured; abdominal segments punctured at base; anterior femur visible; cremaster elongate-conical, smooth, suddenly narrowed at tip, which is bifid.

Hab. Tropical and Subtropical America; *lugubris* occurring occasionally as far north as Massachusetts.

The genus stands as yet isolated.

There is considerable sexual dimorphism and dichromatism in this genus. The five species fall into two natural groups, which are as follows:

I. *E. gorgon*, *taedium*, and *cavifer*:

♂. A fold on subcostal vein of forewing, upperside, covers the anterior part of the cell and extends beyond the apex of the cell well upon the disc; within the fold there is a dense clothing of small white scales, besides a woolly mass of scale-hairs (scent-organ). On the underside the cell is covered with small brown scales, and is more or less distorted; M^2 arising near the base, M^1 in middle. Abdomen with sides of tergites covered with woolly scaling. Hindtarsus strongly compressed, scaling of upper and ventral side long as on tibia.

♀. Normal, discal margin of forewing not denticulated.

II. *E. lugubris* and *ocypete*:

Both sexes normal, distal margin of forewing more or less denticulated.

Key to the species:

A. *Males.*

a. Forewing without fold . . . . . *b*.
Forewing with fold . . . . . *c*.

b. Abdominal margin of hindwing above yellowish white . . . . . 334. *E. ocypete*.
Abdominal margin of hindwing above not yellowish white . . . . . 333. *E. lugubris*.

c. Scent-organ broad, D^2 longer than D^3, R^2 little curved near base . . . . 335. *E. gorgon*.
Scent-organ narrow, D^2 much shorter than D^3, R^2 curved near base . . . . *d*.

d. Forewing black-chocolate for the greater part, with some bluish white thin streaks; a deep cavity near base . . . . 337. *E. cavifer*.
Forewing olivaceous-tawny, without subbasal cavity . . . . . 336. *E. taedium*.

B. *Females* (♀ of *taedium* not known).

a. Forewing denticulate, or at least strongly convex between R^2 and M^1; dark area not sharply defined . . . . . *b*.

	Forewing not denticulate, not obviously convex in middle, dark area very sharply defined except near hinder angle . . .	*c.*
b.	Dark area of forewing prolonged along antemedian line to hinder margin . .	334. *E. ocypete.*
	Dark area of forewing not prolonged along antemedian line to hinder margin . .	333. *E. lugubris.*
c.	Dark area of forewing gradually narrowed at antemedian line	337. *E. cacifer.*
	Dark area of forewing truncate before SM^2.	335. *E. gorgon.*

333. Epistor lugubris.

Drury, *Illustr. Exot. Ins.* i. p. 61. t. 28. f. 2 (1770) (Antigoa).

Sphinx lugubris Linné, *Mant. Plant.* p. 537 (1771) (Antigoa); Drury, *l.c.* Index (1773); Müll., *Naturs. Suppl.* p. 301. n. 5a (1774); Fabr., *Syst. Ent.* p. 537. n. 2 (1775); Goeze, *Ent. Beytr.* iii. 2. p. 202. n. 1 (1780); Fabr., *Spec. Ins.* ii. p 140. n. 4 (1781); id., *Mant. Ins.* ii. p. 92. n. 4 (1787); Gmel., *Syst. Nat.* i. 5. p. 2372. n. 50 (1790); Fabr., *Ent. Syst.* iii. 1. p. 356. n. 5 (1793).

Engo lugubris, Hübner, *Samml. Ex. Schm.* f. 595. 596 (182–) (W. Indies); Walker, *List Lep. Ins. B. M.* viii. p. 113. n. 1 (1856) (partim); Clem., *Jour. Ac. N. Sc. Philad.* iv. p. 139. n. 19 (1859); Morris, *Cat. Lep. N. Am.* p. 18 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 162. n. 1 (1862); Butl., *Trans. Zool. Soc. Lond.* ix. p. 540. n. 1 (1877) (Haiti; Venezuela; Mexico; St. Thomas; Honduras; Santarem; Rio); Dewitz, *Mitth. Münch. Ent. Ver.* i. p. 91 (1877) (Porto Rico); Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 333 (1882) (Surinam; = *luctuosus* = *fegeus*).

Thyrens lugubris, Boisduval, *Cons. Lép. Guatemala* p. 69 (1870) (Georgia to Brazil; Antilles).

Epistor lugubris, id., *Spec. Gén. Lép. Hét.* i. p. 297. n. 1 (1875) (Virginia to Brazil; Antilles).

Triptogon lugubris, Kirby, *Cat. Lep. Het.* i. p. 644. n. 1 (1892).

♂ ♀. Some specimens are of a rather pale burnt-amber colour. Stigma of forewing distinct in both sexes. The species was described from Antigoa. We have not seen an individual from that island. In Drury's figure the wings are broader than in Continental specimens. As the Jamaica specimens are all broad-winged, we thought at first that the examples from all the West Indian Islands except Haiti and Cuba belonged to one subspecies, and those from the Continent, Haiti, and Cuba to another. This is not the case. The specimens from St. Thomas, Guadeloupe, St. Lucia, etc., which we have seen, are not like the Jamaica ones, but resemble closely those from the Continent, though there may be some slight, more or less constant difference discoverable when a longer series is compared. In this case the Continental specimens would form the subspecies *E. lugubris fegeus*, and those from Antigoa and neighbouring islands *E. lugubris lugubris*.

♂. Tenth tergite (Pl. XLIV. f. 11) with a long, straight, mesial process; the three ventral processes slender, close together; sternite asymmetrically dilated at end and twisted (Pl. XLIV. f. 10). Right and left claspers *different*: the left one (Pl. XLVII. f. 17) almost straight dorsally, ventral margin nearly straight to middle, where it is angled and produced into a short tooth, apex narrowed to a long truncate process; right clasper with the ventral margin not angulate in middle, without the ventral tooth, oblique from base to apical process. Penis-sheath (Pl. LIII. f. 32) ending in a long thin process.

♀. The brown discal area of the forewing generally extending along antemedian line to M^1, its inner margin oblique, not very sharply defined, somewhat concave, or straight, extending from stigma to end of R^2, or to hinder angle.

Larva green or brown ; three dorsal lines ; a pale oblique side-band on each segment ; horn long and straight.—Food-plant : *Vitis*.

Pupa (fig. by Abbot & Smith) insufficiently described.

Hab. Massachusetts to Paraguay and South Brazil ; West Indies.

Two subspecies :

a. E. lugubris lugubris.

Sphinx lugubris Linné, *l.c.* ; Fabr., *l.l.c.c.* ; Roem., *Gen. Ins.* p. 19. t. 36. f. 1 (1789) (Antigoa).

♂. *Sphinx fegeus* Cramer, *Pap. Ex.* iii. p. 56. t. 225. f. E (1779) (Surinam).

Sphinx lugubris, Abbot & Smith, *Ins. Georgia* i. p. 59. t. 30 (♂, ♀, *p.*, *l.*) (1797).

Enyo phegeus (!), Hübner, *Verz. bek. Schm.* p. 132. n. 1422 (1822).

Thyreus lugubris, Drury, ed. Westw., *Illustr. Exot Ins.* i. p. 55. t. 28. f. 2 (1837) (partim) ; Harris, in Sillim, *Journ. Sc. Art* xxxvi. p. 306. n. 1 (1839) ; Lucas, in Sagra, *Hist. Cuba* vii. p. 250 (1856).

Pterogon lugubris, Burmeister, *Sphing. Bras.* p. 72. n. 1 (1856) (larva).

Triptogon lugubris, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep. Suppl.* ii. p. 94. n. 1572 (1857) (Haiti).

Triptogon fegeus (!), id., *l.c.* n. 1573 (1857).

Enyo lugubris, Herr.-Sch., *Corresp. Bl.* p. 57 (1865) (Cuba) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 44 (1865) (Cuba) ; id. & Rob., *ibid.* p. 151. n. 17 (1865) ; Grote, *Proc. Ent. Soc. Philad.* vi. p. 328 (1867) ; id., *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (Cuba) ; id., *Bull. Buffalo Soc. N. Sc.* i. p. 20 (1874) (Georgia ; Alabama ; Texas) ; id., *l.c.* ii. p. 225. n. 22 (1875) ; id., *l.c.* iii. p. 221. n. 24 (1877) ; Butler, *Papilio* i. p. 103 (1881) (Indian R., Florida ; *cauertus* sport of *lugubris*) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 6. n. 1 (1881) (partim) ; Gundl., *Contr. Ent. Cubana* p. 180 (1882) ; Grote, *Hawk Moths N. Am.* p. 29 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 123. t. 5. f. 1. 2 (genit.) (1888) (Georgia to Florida, occas. northward to Massachusetts ; synon. partim) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 39 (1889) (liter. rel. to metam.) ; Druce, *l.c. Suppl.* p. 301 (1886) ; Pitt. & Bioll., *Lep. Het.*, in *Inst. Fis. Geogr. Nac. Costa Rica* p. 9 (1897) ; Sloss., *Ent. News* x. p. 96 (1899) (Florida) ; Kaye, *Trans. Ent. Soc. Lond.* p. 140 (1901) (Trinidad).

**Epistor luctuosus* Boisduval, *l.c.* p. 298. n. 2 (1875) (Brazil ;—coll. Charles Oberthür) ; Maass., *Stett. Ent. Zeit.* xli. p. 68 (1880) (= ♀ *lugubris* ?).

Epistor fegeus, Boisduval, *l.c.* p. 299. n. 4 (1875) (Brazil ; Cayenne).

Enyo fegeus, Maassen, *Stett. Ent. Zeit.* xli. p. 54 (1880) (dist. from *lugubris*).

Enyo lugubus (!), Bönninghausen, *Iris* xii. p. 131. n. 66 (1899) (Rio de Jan. ; larva on *Vitis*).

The ♀♀ from Cuba and Haiti are small ; the Cuba ones which we have seen have the margin of the forewing less dentate than Continental specimens. We have no ♂♂ from these islands. The oblique brown discal shade on the forewing is variable in distinctness in the ♂♂ from the Continent.

Hab. West Indies (except Jamaica) and Continent, occasionally as far north as Massachusetts, southward to Argentina.

In the Tring Museum 150-odd specimens from : Cuba ; Florida ; various places of Central and South America.

b. E. lugubris latipennis subsp. nov.

♂♀. Broader winged ; forewing less broadly sinuate between SC^5 and R^3, apex less produced, tawny subapical patch of underside smaller and more fuscous, brown discal lines of upperside more distinct, the disc appearing more variegated.

♂. Apical process of clasper shorter than in the preceding.

Hab. Jamaica.

In the Tring Museum 16 ♂♂ & ♀♀.

334. Epistor ocypete.

♂. *Sphinx ocypete* Linné, *Syst. Nat.* ed. x. p. 498. n. 4 (1758) ; id., *Mus. Lud. Ulr.* p. 344 (1764) ; id., *Syst. Nat.* ed. xii. p. 798. n. 4 (1767) ; Gmel., *Syst. Nat.* i. 5. p. 2373. n. 1 (1790).

♀. *Sphinx camertus* Cramer, *Pap. Ex.* iii. p. 53. t. 225. f. A (1779) (Surinam) ; Goeze, *Ent. Beytr.* iii. 2. p. 227. n. 9 (1780) ; Stoll, in Cram., *l.c. Suppl.* t. 25. f. 1. 1a (1790) (larva, pupa).

♂. *Sphinx danum* Cramer, *Pap. Ex.* iii. p. 53. t. 225. f. B (1782) (Surinam) , Goeze, *l.c.* n. 10 (1880).

Enyo camertus, Hübner, *Verz. bek. Schm.* p. 132. n. 1420 (1822) ; Walk., *List Lep. Ins. B. M.* viii. p. 114. n. 2 (1856) (Brazil ; Para ; Mexico ; S. Domingo) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 140. n. 20 (1859) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 162. n. 2 (1862) ; Herr.-Sch., *Corresp. Bl.* p. 57 (1865) (= *lugubris* ?) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 44 (1865) (Cuba, distinct) ; id. & Rob., *ibid.* p. 152. n. 18 (1865) ; Grote, *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (Cuba) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 541. n. 2 (1877) (Oaxaca ; var. of *lugubris* ?) ; id., *Proc. Zool. Soc. Lond.* p. 483. n. 50 (1878) (Jamaica) ; Gundl., *Contr. Ent. Cubana* p. 180 (1882) (distinct from *lugubris*) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 333 (1882) (Surinam :=*danum*) ; Kirby, *Cat. Lep. Het.* i. p. 644. n. 2 (1892) ; Bönningh., *Iris* xii. p. 131. n. 66 (1899) (Rio de Jan. ; larva on *Vitis*).

Enyo danum, Hübner, *Verz. bek. Schm.* p. 132. n. 1421 (1822) ; Walker, *l.c.* viii. p. 118. n. 12 (1856) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 45 (1865) (Cuba) ; id. & Rob., *ibid.* p. 152 n. 19 (1865) ; Grote, *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (Cuba) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 541. n. 3 (1877) (Peru ; Bolivia ; Haiti ; *ozypete* ?) ; Gundl., *l.c.* p. 182 (1882).

Pterogon camertus, Burmeister, *Sphing. Bras.* p. 72 (1856).

♂. *Enyo lugubris*, Walker, *l.c.* viii. p. 113. n. 1. var. γ (1856).

Thyreus danum, Boisduval, *Cons. Lép. Guatemala* p. 67 (1870).

♀. *Enyo lugubris*, Wallengren, *Oefv. Vet. Ak. Handl.* p. 913 (1871) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 123 (1888) (partim).

Epistor camertus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 298. n. 3 (1875) (Guiana ; Colombia ; Antilles).

Epistor danum, id., *l.c.* p. 299. n. 5 (1875) (Guiana ; Colombia ; Cuba ; Haiti).

Sphinx ozypete (!), Butler, *l.c.* p. 541. sub n. 3 (1877).

♂. *Enyo ocypete*, Aurivillius, *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 128. n. 162 (1882) ; Kirby, *l.c.* n. 3 (1892).

♂ ♀. Many individuals are umber-brown. The brush of scales at the tip of the antenna very prominent, the scales very slender in the ♂.

♂. Abdominal area of hindwing above with a sharply defined yellowish white patch. Tenth abdominal segment as in *lugubris*, but the apical process of the tergite not quite so long and a little curved downward, and the ventral processes also shorter ; sternite twisted at end as in *lugubris*. Clasper (Pl. XLVII. f. 19) without apical process, almost regularly acuminate in apical third ; harpe free at end, more or less truncate. Penis-sheath (Pl. LIII. f. 33) ending in a long pointed process, which is much broader than in *lugubris*.

♀. Similar to the ♀ of *lugubris*, but easily distinguished by the second abdominal tergite bearing a brown belt, by the brown discal area of the forewing extending along the antemedian line to hinder margin, by the sharply marked vinaceous-clay-colonred distal marginal halfmoon, and the smaller stigma.

Larva and pupa figured by Stoll, *l.c.*

Hab. Mexico to Paragnay and Southern Brazil ; Cuba, Haiti, Jamaica.

In the Tring Museum 65 ♂♂, 25 ♀♀ from : Jamaica ; Cuba ; various places from Mexico southward to Bolivia, Matto Grosso and Sao Paulo.

We have only one Jamaica specimen, a ♀ ; this has a rather broader forewing than ordinary Continental individuals.

335. Epistor gorgon.

♀. *Sphinx gorgon* Cramer, *Pap. Ex.* ii. p. 73. t. 142. f. E (1777) (Surinam).

♂. *Sphinx lycius* id., *l.c.* iii. p. 56. t. 225. f. F (1779) (Surinam).

Setia gorgon, Oken, *Lehrb. Naturg.* iii. 1. p. 750. sub n. 4 (1815).

Enyo gorgon, Hübner, *Verz. bek. Schm.* p. 132. n. 1418 (1822) ; Walk., *l.c.* viii. p. 114. n. 3 (1856) (Rio de Jan. ; Venezuela) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 541. n. 4 (1877) (partim ; Rio de Jan. ; Venezuela ; ♂ = *lycus*) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 7. n. 3 (1881) (Mexico ; Brit. Honduras ; Nicaragua ; Chiriqui ; Ecuador) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 333 (1882) (Surinam ; = *lycus*) ; Kirby, *Cat. Lep. Het.* i. p. 644. n. 4 (1892) ; Druce, *l.c. Suppl.* p. 302 (1896) (Jalapa ; Coatepec ; Guatemala ; Panama) ; Bönningh., *Iris* xii. p. 132. n. 67 (1899) (Rio de Jan. ; larva green or brown, on *Vitis*, *Delenia*, etc.) ; Kaye, *Trans. Ent. Soc. Lond.* p. 140 (1901) (Trinidad).

Enyo lycus, Hübner, *Verz. bek. Schm.* p. 132. n. 1419 (1822) ; Walk., *l.c.* viii. p. 115. n. 5 (1856) (Brazil) ; Kirby, *l.c.* p. 645. n. 7 (1892) (partim).

Thyreus lycus, Boisduval, *Cons. Lép. Guatemala* p. 68 (1870) (Nicaragua).

Epistor lycus, id., *Spec. Gén. Lép. Hét.* i. p. 300. n. 6 (1875) (partim).

Epistor gorgon, Boisduval, *l.c.* p. 300. n. 7 (1875) (Guiana ; Brazil).

♂. Antenna imperceptibly incrassate distally ; hook long. Crest of thorax very high. Costal margin of forewing convex before middle owing to the strong development of the scent-organ ; apex sinuate ; posterior area of wing mummy-brown, this colour sharply defined at the fold, by which it is limited, a deep brown triangular discal patch between R^1 and M^1, and an apical patch of the same colour ; hindwing mummy-brown, paler at distal margin, especially near apex.——*Underside :* scent-organ of forewing very broad, strongly convex costally, distally limited by the cross-veins, which are distorted : D^2 twice the length of D^3, running distad, D^2 and D^3 forming a right angle which is open proximally, D^3 forming an obtuse angle with D^4, R^2 from angle D^2. D^3, curved backwards near its base ; D^4 of hindwing more than half the length of D^3.

Tenth tergite of the same type as in *lugubris*, but the apical process much shorter (Pl. XLIV. f. 12), the ventral processes stouter and not so close together. Clasper (Pl. XLVII. f. 18) ending in a long, strongly chitinised, slender process ; dorsal margin strongly convex distally ; hair-scales of apex longer than clasper. Penis-sheath with an indication of the triangular process found in *cavifer*.

♀. Upperside of body and wings ochraceous-clay colour ; forewing flushed with fawn-colour. Chestnut mummy-brown area of forewing posteriorly truncate in front of M^2, continued as a thin line to hinder margin ; apex of forewing sinuate.

Pupa described above.

Hab. Mexico to South Brazil ; not on the West Indian Islands.

In the Tring Museum one pupa, 22 ♂♂, 15 ♀♀ from : Jalapa and Orizaba, Mexico, ii. iii. iv. (Schaus) ; Honduras ; Costa Rica ; R. Dagua, Colombia (Rosenberg) ; Merida, Venezuela ; Maripa, Caura R., Venezuela, vi. (Klages) ; Surinam ; Petropolis ; Bauru, S. Paulo (Dr. Hempel) ; Sapucay, near Villa Rica, Paraguay (Foster).

336. **Epistor taedium.**

Enyo lycus, Walker (*non* Cramer, 1779), *List Lep. Ins. B. M.* viii. p. 115. n. 5 (1856) (partim ; Brazil).

Enyo gorgon, Butler (*non* Cramer, 1777), *Trans. Zool. Soc. Lond.* ix. p. 541. n. 4 (1877) (partim ; Brazil : Venezuela).

**Enyo taedium* Schaus, *Ent. Amer.* vi. p. 19 (1890) (Jalapa ;—coll. Schaus) ; Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 302. t. 66. f. 4 (1896) (Mexico ; Costa Rica).

♂. Differs from *gorgon* in the forewing lacking the dark brown postcellular area and triangular discal patch, further in the far less curved costal margin, the much narrower scent-organ, and different neuration : D^2 and D^3 of forewing in normal position, both straight, lower angle of cell obtuse, more proximal than

upper one, R^2 curved at base. Genital armature as in *gorgon*, apical process of tenth tergite rather shorter and more straight.

♀. Not known.

Hab. Mexico to Southern Brazil.

Two subspecies:

a. E. taedium taedium.

**Enyo taedium* Schaus, *l.c.*

♂. D^3 of forewing about half the length of D^1.

Hab. Mexico to Colombia, probably ranging to Bolivia.

In the Tring Museum 3 ♂♂ from: Rio Dagua, Colombia (W. Rosenberg); Charuplaya, Bolivia, vii. (Simons); Juntas, Canca (Mathan). The last received from Mons. Charles Oberthür, who has a series from Juntas.

b. E. taedium australis subsp. nov.

Enyo lyctus, Walker, *l.c.* (partim).
Enyo gorgon, Butler, *l.c.* (partim).

♂. Differs from the western form in the halfmoon-shaped pale marginal space of the forewing being more sharply defined, pure in colour, with the veins in it not streaked with brown, and in D^3 of the forewing being less than one-third the length of D^1, the cell being narrower than in *taedium taedium*.

Hab. Brazil; Venezuela; probably in all suitable districts east of the Andes.

In the Tring Museum 1 ♂ (*type*) from Petropolis.

In the British Museum 2 ♂♂ from Brazil and Venezuela.

337. **Epistor cavifer** spec. nov.

Thyreus lyctus, Herrich.-Sch. (*non* Cramer, 1779), *Ausser. Schm.* i. f. 108 (1854) (Brazil).
Epistor lyctus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 300. n. 6 (1875) (partim).
Enyo gorgon, Butler (*non* Cramer, 1779), *Trans. Zool. Soc. Lond.* ix. p. 541. n. 4 (1877) (partim).
Enyo lyctus, Kirby, *Cat. Lep. Het.* i. p. 645. n. 7 (1892) (partim).

♂. Body and wings, *above*, much darker than in *gorgon* and *taedium*, chocolate mummy-brown, almost black in some places. Dorso-lateral patches of wool on abdomen large, directed upwards and backwards, sixth tergite with greyish white fringe.——Forewing, *upperside*: apex truncate, not sinuate; basal two-thirds flushed with grey, except a large space between M^2 and R^3 and the costal margin, which are chocolate-black, the greyish area forming a curved band from costal margin to hinder margin at angle; posterior veins within this band with interrupted bluish white streaks, posterior part of grey area crossed by dark undulating lines running from black patch backwards, costal margin with thin bluish white lines proximally of apex of cell; outer third of wing like discal patch, excepting a sharply defined marginal halfmoon from SC^5 beyond M^1, which is clayish; SC^5 and R^1 with interrupted bluish white streaks, bluish white scales also at costal margin; an ovate subbasal cavity behind M, deep, clothed with dispersed narrow and long scales; fold as narrow as in *taedium*.——Hindwing dark mummy-brown, apex down to M^1 and costal area paler; submarginal dark line rather more distal than in the allied species, outer margin less convex.

Underside: barely darker than in *gorgon*. Cell of forewing narrower than in *gorgon* and *taedium*, D^2 very short, curved, D^3 longitudinal, not oblique or transverse; R^2 curved, R^3 also a little.

Tenth segment similar to that of *gorgon*, lateral processes of tergite shorter. Clasper broader than in *gorgon*, apex rounded ventrally, process very short (Pl. XLVII. f. 16). Penis-sheath with a short, apical, horizontal, triangular process.

♀. Body and forewing mummy-brown above; body not much paler below.——Forewing, *upperside*: chocolate-black discal area gradually narrowed to a point behind, not angulate before M^2; apex of wing not sinuate.——Hindwing also darker brown than in *gorgon*, as is the underside of both wings.

Length of forewing: ♂, 29 mm.; ♀, 26 mm.

Hab. Panama to Bolivia; Brazil.

In the Tring Museum 3 ♂♂, 1 ♀ from: Rio Dagua, Colombia (W. Rosenberg) *type*; Brazil; Sta. Catharina.

In coll. Charles Oberthür from Balsapamba; Juntas, Canca (Mathan).

In coll. Staudinger from Chiriqui; Huayabamba, Peru; Rio Songo, Bolivia (Garlepp).

Also in other collections.

Herrich-Schäffer's figure represents this insect, which in the ♂ differs from all the other species in the presence of a deep cavity on the forewing near the base.

CII. PACHYGONIA.—Typus: *subhamata*.

Perigonia Walker, *List Lep. Ins. B. M.* viii. p. 102 (1856) (partim; type: *stulta*).
Macroglossa, Schaufuss (*nec* Ochsenheimer, 1816), *Nunq. Otios.* i. p. 20 (1870).
Pachygonia Felder, *Reise Novara, Lep.* t. 75 (1874) (*nom. indescr.*); Butl., *Trans. Zool. Soc. Lond.* ix. p. 533 (1877) (type: *subhamata*).

♂♀. Antenna without trace of a club, gradually thinning at end into a long slender hook, with short conical end-segment; strongly compressed in ♂, cylindrical and more setiform in ♀. Palpus long, ascending above the eye, closely appressed to head, rounded in side-view, the two palpi obtusely angulate mesially in dorsal view. Abdominal tergites with a number of rows of spines at the edges, the spines all elongate, the uppermost longer than broad, the lowest long, pale in colour, weak; spines of sternites weak; last tergite (8th in ♂, 7th in ♀) broad, scales forming in ♂ three tufts, one in middle and one at each angle, these tufts short in ♀, especially the middle one; seventh sternite of ♀ broad, deeply and broadly sinuate, its edge spinose only at the sides. Merum of midcoxa not angulate; hindtibia appearing compressed owing to the prolonged ventral and dorsal scaling; first hindtarsal segment with the scales ventrally at base and dorsally prolonged into triangular crests, a similar dorsal crest upon the second and third segments, excepting *ribbei*; hindtarsus compressed, four rows of spines, with few or no additional spines between the first and second row; spines of fourth row of midtarsus somewhat prolonged, but stout. SC^2 and R^1 of hindwing from upper angle of cell, R^2 before centre, D^3 very oblique, lower angle of cell acute, D^4 about one-third of D^3: hinder angle of forewing projecting backwards, the hinder margin being sinuate before angle.

♂. Tenth tergite and sternite simple, not divided, elongate, the former densely clothed with stiff hairs, which are directed upwards and proximad. Clasper broad, no friction-scales; harpe with a short process; a patch of short, stiff, spine-like hairs on inner surface of clasper. Penis-sheath ending in a short twisted process, which is not movable; penis-funnel without special armature.

♀. Vaginal plate small, triangular, with the edges somewhat incrassate; orifice basal, mesial; no special armature.

Early stages not known.

Hab. Central and South America.

Five species.

This genus is not nearly related to *Perigonia* and *Nyceryx*, with which it has generally been confounded. The peculiar tufted scaling of the hindleg is the most salient feature by which *Pachygonia* can at once be recognised.

Key to the species :

a. Hindwing with reddish or clayish bands	. .	*b*.
Hindwing with a trace of reddish lines only at anal angle	. . . . .	342. *P. ribbei*.
b. Forewing sinuate at apex or truncate	. .	*c*.
Forewing pointed at apex	. . . .	*d*.
c. Forewing above with an obvious clayish submarginal patch below apex, bands of hindwing obscure, at least in front	. . .	338. *P. subhamata*.
Forewing above without obvious clayish submarginal patch, bands of hindwing clearer red, a third (median) band vestigial	. .	340. *P. hopfferi*.
d. Bands of hindwing obscure	. . . .	339. *P. caliginosa*.
Bands of hindwing clearly marked pinkish red		341. *P. drucei*.

338. **Pachygonia subhamata.**

**Perigonia subhamata* Walker, *List Lep. Ins. B. M.* viii. p. 102. n. 4 (1856) (partim, ♂ not ♀; Para; Venezuela;—Mus. Brit.); Clem., *Proc. Ac. Nat. Sc. Philad.* iv. p. 138. n. 16 (1859) (partim); Morris, *Cat. Lep. N. Am.* p. 17 (1860) (partim); Clem., in Morris, *Syn. Lep. N. Am.* p. 160. n. 2 (1862) (partim); Butl., *Trans. Zool. Soc. Lond.* ix. p. 533. n. 1 (1877); Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 4. n. 1 (1881) (partim; Chiriqui); Kirby, *Cat. Lep. Het.* i. p. 637. n. 1 (1892) (partim; Mexico to Venezuela).

Macroglossa gigantea Schaufuss, *Nunq. Otios.* i. p. 20 (1870) (Venezuela).

Perigonia caliginosa, Boisduval, *Cons. Lép. Guatemala* p. 66 (1870) (partim); id., *Spec. Gén. Lép. Hét.* i. p. 324. n. 7 (1875) (partim).

Perigonia nimerod Boisduval, *Cons. Lép. Guatemala* p. 66 (1870) (*nom. nov. superfluum.*).

Perigonia nimrod id., *Spec. Gén. Lép. Hét.* i. p. 324. n. 7 (1875).

Perigonia grandis id., *l.c.* (*nom. nov. superfluum*).

Pachylia subtcamata (!), Bönninghausen, *Iris* xii. p. 119. n. 30 (1899) (Rio de Jan.).

♂ ♀. Apex of forewing sinuate between SC^4 and SC^5; distal margin concave between SC^5 and R^2, convex at R^2 but not angulate; the clayish grey submarginal patch R^1—R^2 distinct, the species differing in this respect from *hopfferi*, in which the patch is indistinct; bands of hindwing buffish pink, more or less shaded with brown, the pink tint mostly not prominent, most obvious in specimens from Espirito Santo. Hindtarsus in this and the three following species with a ventral crest only on the first segment, and a dorsal crest on segments 1 to 3.

♂. Tenth tergite gradually narrowed, apex abruptly hooked (Pl. XLIV. f. 15. 17): sternite narrowed towards end, slightly spatulate. Clasper nearly as in *hopfferi*; harpe also almost the same, but the process smaller, more spatulate. Process of penis-sheath (Pl. LIII. f. 29) curved, the right edge minutely serrate.

Hab. Central and South America.

In the Tring Museum 5 ♂♂, 3 ♀♀ from: Mexico; San Pedro Sula,

Honduras ; Chiriqui ; Paramba, Ecuador, 3500 ft., April 1897 (Rosenberg) ; Rio Cachyaco, Prov. Iquitos (Maxwell Stuart) ; Espirito Santo ; Paraguay.

339. Pachygonia caliginosa.

Perigonia subhamata Walker, *l.c.* (1856) (partim ; ♀, Mexico).

**Perigonia caliginosa* Boisduval, *Cons. Lép. Guatemala* p. 66 (1870) (partim ; Felder's figure) : id., *Spec. Gén. Lép. Hét.* i. p. 324. n. 7 (1875) (partim).

**Pachygonia caliginosa* Felder, *Reise Novara, Lep.* t. 75. f. 10 (1874) (Amazons ;—Mus. Tring) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 351 (1877) (Surinam).

Pachygonia subhamata, id., *l.c.* xxxii. p. 333 (1882) (Surinam) ; Butler, *Trans. Zool. Soc. Lond.* ix. p. 533. n. 1 (1877) (partim) ; Kirby, *Cat. Lep. Het.* i. p. 637. n. 1 (1892) (partim).

♂ ♀. Generally mixed up in collection with *subhamata*, from which it differs as follows :

Apex of forewing pointed, not sinuate between SC^4 and SC^5, *i.e.* not dentate at SC^5 ; underside paler, clayish. Tenth tergite (♂) less compressed at end, more evenly rounded in side-view, sternite rather broader (Pl. XLIV. f. 14. 16) ; process of penis-sheath (Pl. LIII. f. 30) much less curved, its right edge not serrate, apex bifid as in *hopfferi*.

Hab. Central and South America.

In the Tring Museum 3 ♂♂, 6 ♀♀ from : Rio Demerara, Brit. Guiana ; Amazons (Bates, *type*) ; Suapure and Maripa, Caura R., Veneznela, i. viii. (Klages).

In coll. Staudinger from Colombia ; Puerto Cabello ; Surinam ; Rio Ucayali, Peru.

Boisduval's specimens described in *Lep. Guatemala, l.c.*, are preserved in the collection of Mons. Charles Oberthür ; the ♂ is *subhamata*, while the ♀ belongs to the present species. If Boisduval had not cited Felder's plate, and not clearly shown by the synonymy that he adopted the name from Felder's plate in preference to his own manuscript name—which, however, he could not persuade himself to suppress altogether, publishing it among the synonyms in a distorted form—the name *caliginosa* would have to be sunk as a synonym of *subhamata* ; but as the facts are, we must regard Felder's figure as the type of Boisduval's *caliginosa*, *i.e.* the individual from which that figure was taken as the type of the present species.

340. Pachygonia hopfferi.

**Pachygonia hopfferi* Staudinger, *Verh. Zool. Bot. Ges. Wien* xxv. p. 118 (1875) (Chiriqui ;—coll. Staudinger) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 635 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 637. n. 2 (1892) (partim).

Pachygonia hoppferi (!), Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 4. n. 2 (1881) (partim).

♂ ♀. Apex of forewing truncate or sinuate, distal margin angulate at R^2, concave between SC^5 and R^2 ; clayish patch near the sinus not distinct ; submedian and discal blackish band merged together, the median interspace between them marked behind as an olive-russet patch, this patch sometimes vestigial. Bands of hindwing rose-pink, a third band vestigial, crossing apex of cell, the black median band a little more proximal than in *subhamata*.

♂. Tenth tergite (Pl. XLIV. f. 13) somewhat carinate above before middle, apex pointed, shortly hooked ; sternite gradually narrowed to end, this rounded, feebly curved upwards. Clasper (Pl. XLVII. f. 9) large, somewhat acuminate ; harpe curving upwards, then produced into a short, blunt, almost horizontal process. Process of penis-sheath (Pl. LIII. f. 28) rather long, slender, twisted, ending in two fine points.

Hab. Chiriqui, Panama, to Bolivia.

In the Tring Museum 4 ♂♂, 1 ♀ from: Perené R., Peru, March 1900 (Simons); R. Cachyacu, Prov. Iquitos (Maxwell Stuart); Panama.

In coll. Standinger from: Chiriqui; Peru; Colombia; Rio Songo, Bolivia.

341. **Pachygonia drucei** spec. nov.

Pachygonia hoppferi (!), Druce (*non* Standinger, 1875), in *Biol. Centr. Amer., Lep. Het.* i. p. 4. n. 2. t. 1. f. 1 (1881) (syn. excl.; Chiriqui).
Pachygonia hopfferi, Kirby, *Cat. Lep. Het.* i. p. 637. n. 2 (1892) partim).

♂♀. Differs from *hopfferi* in the following points:

Forewing pointed, not sinuate between SC^4 and SC^5, very shallowly concave between tip and R^2, not angled at R^2, stigma rather larger, clayish patch below apex much more distinct, whitish scaling at hinder angle more obvious; red bands of hindwing rather broader, under surface more clayish.

♂. Tenth tergite more compressed at the tip, less gradually rounded in side-view; sternite much narrower in apical half. (Penis-sheath broken in our only male.)

Hab. Chiriqui and Honduras; most likely more widely distributed.

In the Tring Museum 1 ♂, 3 ♀♀ from Chiriqui; *type*: ♂.

In coll. Standinger from Honduras.

342. **Pachygonia ribbei.**

**Pachygonia ribbei* Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 4. n. 3. t. 1. f. 2 (1881) (Chiriqui;—coll. Staudinger); Kirby, *Cat. Lep. Het.* i. p. 638. n. 3 (1892).

♂♀. Whereas the four other species of *Pachygonia* resemble one another closely, the present insect deviates considerably both in structure and colour. The scaling of the hindtibia differs in there being a dorsal and a ventral triangular crest on the first segment, but no crests on the second and third. The distal margins of the wings are more or less denticulate; the hinder angle of the forewing is less produced than in the other species; the reddish bands of the hindwing of *subhamata*, etc., are indicated by two short bars at the anal angle. On the forewing below there is a black, curved, discal band. The mesial dots of the abdominal tergites and the clayish postapical patch of the forewing found in the other species are also marked in *ribbei*.

♂. Tenth tergite shorter than in the other species, very densely clothed with hairs, compressed, basally elevated in the mesial line, tip rounded, more strongly so than in Pl. XLIV. f. 13, sinuate in a frontal view; sternite not much shorter than tergite, narrowed in apical fourth, tip rounded, somewhat curved upwards. Clasper slightly narrowing to the broadly rounded end; harpe (Pl. XLVII. f. 10) dilated at end into an obtuse dorsal and an acute ventral process; from the harpe extends an angle-shaped fold on the clasper, the space limited by this fold clothed with blackish spiniform hairs. Penis-sheath (Pl. LIII. f. 27) with an obtusely pointed, three-edged process, the right-side edge of which is dentate.

Hab. Chiriqui, Panama.

In the Tring Museum 2 ♂♂, 1 ♀ from Chiriqui.

CIII. HIMANTOIDES.—Typus: *undata*.

Perigonia Walker, *List Lep. Ins. B. M.* viii. p. 103 (1856) (partim).
Himantoides Butler, *Trans. Zool. Soc. Lond.* ix. p. 626 (1877) (*nom. indescr.*): Kirby, *Trans. Ent. Soc. Lond.* p. 234. 240 (1877) (*nom. indescr.*); Butl., *ibid.* p. 395 (1877) (descript.).

♂ ♀. Allied to *Pachygonia*. Antenna very long, reaching beyond fork SC^{4+5} of forewing, filiform, slightly incrassate in ♀ before the long and gradually tapering hook, end-segment about three times as long as broad. Palpi rounded in dorsal and in lateral view, ascending above eye, closely appressed to head. Frons slightly crested; side-scales forming a kind of eyebrow. Spines at edges of abdominal segments elongate, only two rows present; scales at ventral edges of tergites prolonged, especially in ♂, anal mesial tuft smooth, truncate, conical, not fan-like, ventro-lateral scales prolonged to two rather thin but prominent tufts in both sexes; seventh sternite of ♀ transverse, short, apical edge straight and entirely spinulose. Foretibia externally and hindtibia above and below with long scaling, first hindtarsal segment also with long scales. R^3 and M^1 of hindwing on a short stalk; hinder angle of forewing obtuse, not projecting backwards.

♂. Tenth segment simple, not divided, narrow and long, sternite longer than tergite. Clasper (Pl. XLVII. f. 15) long, narrow, with almost parallel sides, curved upwards, apex rounded, dorsal margin with very long scaling proximally, inner surface densely clothed with long stiff hairs; harpe short, ending in a short, slender and slightly clubbed process. Penis-sheath with a spatulate, densely dentate process, as shown by Pl. LIII. f. 43.

♀. Vaginal plate feebly chitinised except at edges, triangular, short.

Early stages not known.

Hab. Jamaica.

One species.

343. Himantoides undata.

**Perigonia undata* Walker, *l.c.* n. 6 (1856) (Jamaica;—Mus. Brit.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 328. n. 13 (1875).
Himantoides undata, *Trans. Zool. Soc. Lond.* ix. p. 626 (1877); Kirby, *Trans. Ent. Soc. Lond.* p. 234. 240 (1877); Butl., *ibid.* p. 395 (1877); Kirby, *Cat. Lep. Het.* i. p. 634. n. 1 (1892) (Jamaica).

♂ ♀. The sexes differ obviously in the forewing, which is much more variegated in the ♀ than in the ♂. The series of black dots on the abdomen, above, corresponds to the respective dots of *Pachygonia*. The median interspace of the forewing, which includes a distinct white black-edged stigma, is widened in front, standing at right angles to the costa and reaching hinder margin at outer third; it is generally white behind and fuscous in front, seldom all greyish. The orange median band of the hindwing is dilated basad in front. The fringe and edge of the wing are somewhat orange before anal angle, reminding one of *Eupyrrhoglossum sagra*. The basal area of the forewing, below, exclusive of a black triangular patch, and the basi-abdominal area of the hindwing are orange.

♂. Tenth segment bent downwards, forming an obtuse angle with the rather elongate ninth segment (Pl. XLIV. f. 8); tergite obtuse at end, which is faintly hooked in side-view; sternite long, narrow, produced into a thin point which curves downward, upperside of sternite concave, the groove gradually narrowing distally,

not extended to end of sternite, edges of groove somewhat dilated triangularly beyond middle, the sternite resembling that of *Aleuron chloroptera* ; a faint angular projection at the left edge is a remnant of the aborted left half of the sternite. Clasper and penis-sheath see Pl. XLVII. f. 15. and Pl. LIII. f. 43.

Hab. Jamaica.

In the Tring Museum 7 ♂♂, 3 ♀♀ from Jamaica.

CIV. CAUTETHIA.—Typus : *noctuiformis.*

Oenosanda Walker (*non* id., 1854), *List Lep. Ins. B. M.* viii. p. 231 (1856) (type : *noctuiformis*).
Cautethia Grote, *Ann. Lyc. N. York* viii. p. 202 (1867) (nom. nov. loco *Oenosanda*).
Braesia id & Robinson, *Trans. Amer. Ent. Soc.* ii. p. 77 (1869) (*nom. nud.*)

This genus agrees with *Himantoides* in many details, such as neuration, anal tufts, sexual armature, etc. ; but differs in the shorter antenna and the normally scaled legs. A comparison of the structure of the two genera leaves no doubt that they are nearer related to each other than to any other genus.

Clasper long, curved, as in *Himantoides* ; tenth segment, harpe, and penis-sheath different in the three species.

Larva described by Dyar, see *grotei* ; on *Chiococca*, *Rubiaceae*, according to Dyar.

Hab. West Indies ; Florida ; Mexico.

The species of this genus represent each other geographically. Though they agree closely in colour, we keep them specifically separate mainly for the reason to induce lepidopterists who receive material of *Cautethia* from new localities to study the specimens closely, and to examine especially the genital armature, instead of putting the individuals simply down as "*noctuiformis.*"

344. **Cautethia spuria.**

**Oenosanda spuria* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 319. n. 2. t. 8. f. 3 (1875) (Mexico ; – coll. Charles Oberthür).
Cautethia spuria, Butler, *Trans. Zool. Soc. Lond.* ix. p. 633 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 699. n. 4 (1892) ; Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 313. n. 1 (1896) (Jalapa).

♂♀. Larger than the other species ; yellow area of hindwing rather paler.

♂. Tenth segment larger than in the other forms (Pl. XLIII. f. 33) ; tergite slightly shorter than the sternite in a lateral view (Pl. XLIII. f. 34), broader than in *grotei* and *noctuiformis*, apex strongly convex, apical edge truncate-sinuate with the angle acute ; sternite large, apex divided and hollowed out in a peculiar manner, being divided into three lobes, one mesial and ventral, short, sinuate-truncate, thin, acute in side-view, the other two lobes rounded, incrassate, densely clothed with short spines. Harpe (Pl. XLVII. f. 14) triangular, pointed, but not projecting. Penis-sheath with small apical dentate process, pointing distad. (Pl. LIII. f. 35).

Hab. Mexico.

Type in coll. Charles Oberthür. 2 ♂♂ from Jalapa in coll. Wm. Schaus (from one of these the figures of the sexual armature have been taken). Also in the British Museum.

345. Cautethia grotei.

Cautethia spec., Butler, *Papilio* i. p. 105 (1881) (Indian R., Fla. ; is not *noctuiformis*).
Cautethia grotei Edwards, *Papilio* ii. p. 10 (1882) (Indian R., Fla. ; is Macroglossid) ; id., *Ent. Amer.* iii. p. 163 (1887) (pupa) ; Kirby, *l.c.* n. 3 (1892) ; Dyar, *Psyche* vii. p. 385 (1896) (descr. of larva ; on *Chiococca racemosa* ; Lake Worth, Fla.) ; id., *Proc. U. St. N. Mus.* xxxiii p. 255 (1900).

♂ ♀. The silvery-grey colour of the forewing and body prominent.

♂. Tenth tergite (Pl. XLIII. f. 31) much longer than the sternite, somewhat hooked at end ; sternite strongly curving upwards, forming almost a semicircle in side-view (Pl. XLIII. f. 32), sinuate at end, the lobes rounded, somewhat incrassate on the upperside, base of sternite broad, dilated into a rounded lobe at each side, the edge of this lobe, as well as of the curved process, rough with short spines. Harpe (Pl. XLVII. f. 13) long, pointed, not projecting. Penis-sheath (Pl. LIII. f. 36) without process.

Hab. Bahamas ; Florida.

In the Tring Museum 22 specimens from : Bahamas (Sir G. Carter) ; Florida.

346. Cautethia noctuiformis.

**Ocnosanda noctuiformis* Walker, *List Lep. Ins. B. M.* viii. p. 232. n. 1 (1856) (St. Domingo ;—Mus. Brit.) ; Clem., *Proc. Ac. N. Sc. Philad.* iv. p. 187. n. 92 (1859) (St. Domingo) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 79. 83 (1865) (Cuba) ; Herr.-Sch., *Corresp. Bl.* p. 57 (1865) ; Schauf., *Nunq. Otios.* i. p. 23 (1870) (Cuba) ; Dew., *Mitth. Münch. Ent. Ver.* i. p. 91 (1877) (Porto Rico).
Cautethia noctuiformis, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 168 (1865) (Cuba) ; Grote, *Ann. Lyc. N. York* viii. p. 202 (1867) ; Herr.-Sch., *Auss. Schm.* ii. f. 552 (1869) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 602 n. 1 (1877) (Haiti) ; Kirby, *Cat. Lep. Het.* i. p. 699. n. 1 (1892).
Braesia hipparsus Grote & Robinson, *Trans. Amer. Ent. Soc.* ii. p. 77 (1869) (*nom. nov. superrac.*).
Cautethia grotei, Gundlach (*non* Edwards, 1882), *Contr. Ent. Cubana* p. 179 (1882) (Cuba ; larva on *Rubiaceae*).

♂ ♀. The amount of yellow on the hindwing is variable, in some individuals the black marginal band extending almost to cell ; below, the yellow area is sometimes reduced to a small patch.

♂. Tenth tergite shorter than the sternite (Pl. XLIII. f. 29. 30), truncate-sinuate, slightly dilated at end ; sternite rounded at end, club-shaped in a side-view, the upper surface being swollen at apex, this swollen part divided mesially and each half transversely ribbed. Harpe (Pl. XLVII. f. 12) with a short, obtuse, incrassate, process which is denticulate at the edge on the inner side. Penis-sheath produced into a dentate process, which is longer than the sheath is wide. (Pl. LIII. f. 34).

Hab. St. Thomas ; Porto Rico ; Haiti ; Cuba.

In the Tring Museum 3 ♂♂, 5 ♀♀ from : Cuba ; St. Thomas.

CV. NYCERYX.—Typus : *hypostícta*.

Perigonia Walker, *List Lep. Ins. B. M.* viii. p. 100 (1856) (partim) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 320 (1875) (partim).
Aubulyx, Felder (*non* Walker, 1856), *Reise Novara, Lep.* t. 77 (1874).
Nyceryx Boisduval, *l.c.* p. 16 (1875) (type : *hypostícta*).

♂ ♀. Close to *Perigonia*, apex of forewing sinuate between SC^4 and SC^5, or truncate.

♂. Clasper with friction-scales; no patch of spines above harpe; penis-funnel mostly with special armature.

Early stages not known.

Hab. Tropical and Subtropical America, from Mexico to Buenos Ayres.

Twelve species.

The position of *N. hypostícta* has been entirely misunderstood by the writers on *Sphingidae*. The species has nothing whatever to do with "*Ambulyx*," with which *Nyceryx* is generally associated. It cannot be separated generically from *ericea*, *coffeae*, etc.

Key to the species:

a. Forewing below with conspicuous yellow spots from base to disc . . . . . 347. *N. hypostícta*.
Forewing below without yellow spots in basal half . . . . . *b*.

b. Yellow area of hindwing, above, extending to abdominal edge, at least in middle . . . . *g*.
Abdominal margin of hindwing brown . . . . *c*.

c. Basal area of forewing below yellow . . 351. *N. tacita*.
Basal area of forewing below brown . . . . *d*.

d. Yellow area of hindwing, above, traversed by a broad discal band . . . . . 349. *N. coffeae*.
Hindwing without continuous discal band . . . *e*.

e. Forewing below variegated with ochraceous or white halfmoons . . . . . *f*.
Forewing below not variegated with ochraceous or white halfmoons, palpus without white dot . . . . . 350. *N. magna*.

f. Hindwing above yellow, with a conspicuous black spot at end of cell, and another on disc behind SC^2; forewing below almost unicolorous, with a patch of conspicuous whitish halfmoons anteriorly on disc . . 348. *N. ericea*.
Hindwing above more or less rufous, seldom more ochraceous, with vestigial brown spots, antemedian band of forewing not filled in with black; fringe of mesothoracic tegula brown . . . . . 353. *N. nictitans*.
Hindwing above yellow, apex of wing vinaceous-rufous; fringe of mesothoracic tegula almost white; antemedian band of forewing filled in with black; white spot of palpus conspicuous . . . . . 352. *N. maxwelli*.

g. Black submarginal line of forewing, which runs from apex to hinder angle, strongly angulated in middle . . . . . *h*.
Black submarginal line of forewing, which runs from apex to hinder angle, evenly curved . . . . . *j*.

h. Ochraceous ground-colour of anterior distal part of disc of forewing below divided up into rather sharply defined halfmoons .	356.	*N. nephus*.
Forewing below not ochraceous on disc, or the ochraceous spots ill-defined		*i*.
i. Pronotum and anterior part of mesonotum grey, only with a brown mesial line, no distinct lines in basi-costal area of forewing above	354.	*N. continua*.
Pronotum and mesonotum faintly variegated with brown ; a rather obvious abbreviated subbasal band or patch on forewing . .	355.	*N. alophus*.
j. Apex of forewing sinuate	357.	*N. riscus*.
Apex of forewing truncate	358.	*N. stuarti*.

347. **Nyceryx hyposticta.**

**Ambulyx hyposticta* Felder, *Reise Novara, Lep.* t. 77. f. 2. 3 (1874) (Colombia ;—Mus. Tring).
Nyceryx hyposticta, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 16. n. 1 (1875) (Colombia) ; Kirby, *Cat. Lep. Het.* i. p. 677. n. 1 (1892).
Nyceryx rega Boisduval, *l.c.* (*nom. superrac.*).
Ambulyx? hyposticta, Butler, *Trans. Zool. Soc. Lond.* ix. p. 582. n. 19 (1877).

♂♀. The largest species of the genus. The association with *Ambulyx* is wild. In shape of the wings, pattern, and structure, *hyposticta* is close to *ericea*, *magna*, *nictitans*, etc. Its pattern is of a more generalised type. The white, sparsely scaled, discal spots of the forewing correspond to the semi-transparent spots found in *Sesia fadus* and allies. Similar spots are found in *ericea*. The interspaces between the obscure lines of the forewing bear conspicuous yellow spots on the underside in the basal half.

♂. Ninth and tenth segments broad ; processes of tenth comparatively short, resembling those of *continua*, tergal ones rather club-shaped in side-view. Harpe short, truncate-sinuate, the upper lobe a little projecting, rounded. Penis-sheath of the same type as in the other species ; whip (Pl. LIV. f. 1) with few teeth ; left ridge not prominent, also with few teeth ; ridge on right side with four teeth ; armature of penis-funnel symmetrical, the mantle hairy, no processes, but a rather high ventral rounded ridge at each side.

Hab. Colombia and Venezuela to Bolivia.

In the Tring Museum 11 ♂♂ from : Bogota ; R. Dagua, Colombia (Rosenberg) ; St. Domingo, S.E. Peru, i. vi. (Ockenden) ; Merida (Briceno).

In coll. Charles Oberthür a series from Huambo and Chachapoyas, Peru (Mathan).

In coll. Staudinger from Chanchamayo and Huayabamba, Peru ; R. Songo and R. Tanampaya, Bolivia.

In coll. Dognin from Loja.

348. **Nyceryx ericea.**

**Pachygonia ericea* Druce, *Ann. Mag. N. H.* (6). ii. p. 235 (1888) (Chiriqui ;—coll. Staudinger) ; Kirby, *Cat. Lep. Het.* i. p. 638. n. 9 (1892) ; Druce, *Biol. Centr. Amer., Lep. Het. Suppl.* t. 65. f. 2 (1896).
Pachygonia coffeae, id. (*non* Walker, 1856), *l.c.* p. 299. n. 4 (1896) (Honduras ; Chiriqui ; not "Brazil").

♂♀. A very distinct species, which is as nearly related to *nictitans*, *continua*, etc., as to *coffeae*. Olive-black area of the mesothoracic tegula sharply defined dorsally.

Upperside of wings.——Forewing: a black streak before middle of SM^2, a little towards base, connecting two lines, the proximal one of them widened at inner margin to a triangular patch; some pale postdiscal lunules outside the black, curved, oblique, discal band, followed by a conspicuous black line, which stops at R^2, but appears again at R^3, and is then continued to SM^2, anteriorly the line is preceded by a conspicuous apical lunule; stigma with some white scales.——The yellow area of the hindwing is sharply defined; it includes anteriorly three brownish black spots, which are contiguous with the costal border, the middle one thinnest, but sometimes prolonged to a line.

Underside burnt umber colour, rufous-tawny scaling appearing only here and there; on the forewing there are a number of whitish lunules in the subapical area, and a slightly curved linear mark near anal angle; on the hindwing two linear subanal markings and a dot SC^2—R^1 cinnamon-rufous, or paler.

♂. Tenth abdominal segment nearly as in *riscus* (Pl. XLI. f. 25), tergite broader at end. Harpe elongate, the process free, horizontal, compressed, subconical at end. Penis-sheath (Pl. LIV. f. 5): whip with a few tubercles; at the right side there are three teeth, besides the two bristles; the left lobe prominent, its distal edge almost horizontal, the lobe being much more slanting proximally than distally. Armature of the penis-funnel (Pl. LIII. f. 44) asymmetrical; there is one dentate process on each side, as in *nictitans*, but the left one is prolonged and straight, while the right one is short and curved.

Hab. Honduras to Colombia, probably extending farther south.

In the Tring Museum 1 ♂, 1 ♀, from Chiriqui.

In the collection of Charles Oberthür from Juntas, Cauca, Colombia (Mathan).

349. **Nyceryx coffeae.**

**Perigonia coffeae* Walker, *List Lep. Ins. B. M.* viii. p. 101. n. 2 (1856) (Brazil;—Mus. Brit.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 322. u. 3. t. 8. f. 4 (1875) (N. Friburgo); Bönningh., *Iris* xii. p. 132. n. 69 (1899) (Rio de Jan.).

Macroglossa abboti Schaufuss, *Nunq. Otios.* i. p. 21 (1870) (Colombia).

Pachygonia coffrae, Butler, *Trans. Zool. Soc. Lond.* ix. p. 533. n. 2 (1877) (Brazil); Kirby, *Cat. Lep. Het.* i. p. 638. n. 4 (1892) (Brazil).

**Pachygonia boisduvali* Butler, *l.c.* p. 633 (1877) (nom. nov. pro *coffeae* Boisd.;—coll. Charles Oberthür); Kirby, *l.c.* n. 6 (1892); Druce, *Biol. Centr. Amer., Lep. Het. Suppl.* p. 299 (1896) (Brazil, = *cricea* ex errore).

Pachygonia abboti, Kirby, *l.c.* n. 7 (1892).

♂♀. Differing from all other species in the yellow area of the hindwing being traversed by a brown band, which stops in front at SC^2. Forewing obtusely angulated at R^3, feebly sinuate between R^3 and SM^2, less sinuate between SC^5 and R^3 than in the other species; stigma large, not deeper in tint than the other brown markings, encircled by a thin white line. Underside of palpus of the same colour as the femora and tibiae, and the underside of the abdomen and wings.

♂. Tenth segment (Pl. XLI. f. 27) nearly as broad as in *stuarti*, sinus very wide, lobes comparatively short; tergite shorter than sternite; the broad tip of the lobes outside those of the sternite; the latter almost horizontal, not strongly curved, slightly dilated before the short apical hook. Harpe a low ridge which gradually fades away, without a free process, not reaching to the middle of the

ventral margin of the clasper. Penis-sheath (Pl. LIII. f. 40) ending in an obtuse dorsal lobe, which is dentate at the end ; on the left side there is a dentate longitudinal ridge, while there are only a few teeth at the apical margin on the right side, besides two bristles, which stand on a short process in one of the specimens dissected.

Hab. Honduras to Rio de Janeiro.

In the Tring Museum 9 ♂♂, 4 ♀♀ from : Brit. Honduras ; Honduras ; Aroa, Venezuela, April ; Rio Cachyaco, Prov. Iquitos, Peru (Stuart) ; St. Domingo, S.E. Peru (Ockenden) ; Amazonas (Bates) ; Espirito Santo.

The specimen figured by Boisduval and named *boisduvali* by Butler is a small individual of the present species.

The insect described by Schaufuss as *abboti* is doubtless the same as *coffeae*.

350. Nyceryx magna.

**Perigonia magna* Felder, *Reise Novara, Lep.* t. 75. f. 12 (1874) (Peru ;—Mus. Tring) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 320. n. 1 (1875) (Para).

Pachygonia magna, Butler, *Trans. Zool. Soc. Lond.* ix. p. 534. n. 4 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 638. n. 8 (1892) (Peru).

♂♀. This magnificent species is apparently rare. Antenna very pale buff. Brownish black border of hindwing gradually widening behind, very broad, touching lower angle of cell ; a small black stigma ; costal area of hindwing orange-rufous, much more reddish than in *coffeae*, *ericea*, etc. Tenth tergite (Pl. XLI. f. 26) broad and rather short ; sternite suddenly narrowed into a long, slender, feebly curved hook, which is somewhat dilated near the base. Harpe similar to that of *stuarti* (Pl. XLVII. f. 3), but slightly broader at the end. Penis-sheath (Pl. LIV. f. 2) with a short, rather prominent, dentate ridge at the right side ; the left lobe high, more prominent than in any other species, whip with teeth only at the end (in all specimens ? one only examined !). No armature to penis-funnel, but there is a long, slightly asymmetrical, rounded, concave lobe ventrally of the penis-sheath (Pl. LIV. f. 2).

Hab. Peru ; Ecuador.

In the Tring Museum 2 ♂♂ from : Peru ; Rio Cachyaco, Prov. Iquitos (Stuart). In coll. P. Dognin from Loja. In Mus. Stettin a ♀ from St. Inez, Ecuador.

351. Nyceryx tacita.

**Perigonia tacita* Druce, *Ann. Mag. N. H.* (6). ii. p. 236 (1888) (Chiriqui ;—coll. Staudinger) ; Kirby, *Cat. Lep. Het.* i. p. 637. n. 10 (1892) ("United States" err. loci) ; Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 299. n. 4. t. 65. f. 3 (1896) (Mexico ; Chiriqui).

♂♀. Ground-colour of wings variable, often with a rather obvious ochraceous tint. Eighth abdominal sternite with *white* apical fringe. Interspaces between the dark lines of the forewing, above, rather obviously marked with silvery grey ; a broad black patch in middle of hinder margin, widening towards base, reaching to cell, then continued to costa by a narrower band ; forewing below chrome-yellow from base to disc, this colour gradually merging into the bright tawny colour of the anterior part of the disc. Scaling of antenna, base and hook excepted, very pale.

♂. Tenth abdominal segment similar to that of *nictitans*, but differing essentially in the triangular tooth of the sternite standing in *nictitans* before the apical hook being barely indicated in *tacita*. Harpe (Pl. XLVII. f. 2) truncate,

without free projecting process. Penis-sheath (Pl. LIV. f. 4): a low dentate ridge at the right side, rather long; the membranaceous lobe on the left side not much projecting, the rather broad whip multidentate. Armature of penis-funnel (Pl. LII. f. 47) as in *nictitans*; there is a single dentate process on each side, the processes curving towards each other, touching one another (or nearly so) above the opening for the penis-sheath. On the ventral side of the funnel there is a mesial carina rising distally into a prominent tubercle; this carina is rough with minute teeth.

♀. Not dissected.

Hab. Mexico to Bolivia.

In the Tring Museum 2 ♂♂ from Chiriqui.

In coll. Staudinger 2 ♂♂, 2 ♀♀ from: Chiriqui; R. Juntas, Bolivia, 1000 m., and Callanga, Peru, 1500 m. (Garlepp).

In coll. Schaus from Orizaba, Mexico.

352. Nyceryx maxwelli.

**Pachygonia maxwelli* Rothschild, Nov. Zool. iii. p. 2 (1896) (San Augustin, Bolivia;—Mus. Tring). *Pachygonia stuarti* id., *l.c.* t. xiii. f. 3 (1896) (laps. calami).

♂. Larger than *continua*; apex of hindwing reddish, abdominal area brown, the yellow colour stopping at (SM^1). Harpe similar to that of *tacita* (Pl. XLII. f. 2). Penis-sheath (Pl. LIV. f. 3) with a compressed, obtuse, dentate process at the right side; the dentate lobe or ridge of the left side evenly rounded; whip long, with several apical teeth. Armature of penis-funnel (Pl. LIII. f. 46) essentially different from that of the allied forms; the funnel itself produced on each side into an acute rugate process; laterally of this there is a very densely denticulate lobe, curving laterad apically.

♀. Not known.

Hab. Bolivia; Peru.

In the Tring Museum 2 ♂♂ from: San Augustin, Mapiri R., Bolivia, 3500 ft., Sept. 1895 (Arthur Maxwell Stuart); St. Domingo, S.E. Peru (Ockenden).

Only these two specimens known as yet. The Peru individual is more grey on the upperside of the forewing than the type, less variegated on forewing below, and differs in other details.

353. Nyceryx nictitans.

**Perigonia nictitans* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 322. n. 4 (1875) (Minas Geraes;—coll. Charles Oberthür).

Pachygonia nictitans, Butler, *Trans. Zool. Soc. Lond.* ix. p. 633 (1877); Kirby, *Cat. Lep. Het.* i. p. 638. n. 5 (1892).

Perigonia spec., Bönninghausen, *Iris* xii. p. 133 (1899) (Rio Grande do Sul).

♂♀. Abdomen below with two black, thin but distinct lines, occasionally with a third line in middle. Stigma of forewing minute, with a white dot at its proximal side; brown discal shade from costal to outer margin nearly as in *coffeae*. Ochraceous-rufous area of hindwing with traces of brown lines and a brown stigma; abdominal area blackish brown, shaded with grey.

♂. Tenth abdominal segment: tergite obtuse in lateral view (Pl. XLI. f. 24); on inner surface a feeble carina which is raised apically into an indistinct tooth; sternite very slender, armed with a heavy tooth before the long apical hook, which is almost horizontal; this tooth is flattened horizontally, being broader in a ventral

aspect (Pl. XLI. f. 23) than in a view from the side (Pl. XLI. f. 24). Harpe elongate-triangular, resembling that of *stuarti* (Pl. XLVII. f. 3), conical distally, apex obtuse. Penis-sheath nearly as in *ericea* (Pl. LIV. f. 5), but whip with more tubercles. Armature of penis-funnel (Pl. LIII. f. 48): only one process on each side, this process heavily dentate at the outer and distal edges; below the funnel (in front of it in figure) there is a deeply sinuate ridge; the membrane surrounding the armature laterally and dorsally as a kind of mantle neither spinulose nor hairy.

♀. Vaginal plate finely folded transversely, obtusely triangular distally; vaginal orifice quite proximal, a little towards the left side.

Hab. Brasilia; Peru.

Two subspecies:

a. N. nictitans nictitans.

**Perigonia nictitans* Boisduval, *l.c.*

♂♀. Easily distinguishable from the other species of southern Brazil by the reddish colour of the hindwing and the brown abdominal area which extends to the base. On the underside of the forewing there is a large postdiscal patch between costal margin and R^3 of an ochraceous clay colour, including proximally a sharply marked brown line, besides traces of another line; this patch is separated from a posterior discal patch of the same colour; black submarginal line bordering the greyish brown marginal band straight from R^3 to hinder margin.——Hindwing dirty rufous-ochraceous, except margins, three discal lines and a stigma.

Hab. Southern Brazil: Rio de Janeiro to Rio Grande do Sul.

In the Tring Museum 4 ♂♂, 1 ♀ from: St. Cruz, Rio Grande do Sul; St. Catharina.

b. N. nictitans saturata subsp. nov.

♂. *Upperside.*——Forewing more heavily lobed and deeper in tint than in the preceding.——Hindwing less distinctly rufous.

Underside of wings and abdomen deeper tawny and chestnut-tawny, the greyish black colour more extended; the postdiscal postcostal patch of forewing chestnut-tawny, much reduced, reaching SC^4 only distally, 1 mm. or less wide between SC^4 and SC^5, the posterior discal patch also reduced, the brown lunulated lines within it heavy; greyish brown borders of hindwing broader than in the preceding, the chestnut-tawny area consequently more reduced, not reaching distally to C, as it does in the Brazilian form.

Hab. Peru.

In the Tring Museum 4 ♂♂ from Chanchamayo, Peru.

354. **Nyceryx continua.**

**Lophura continua* Walker, *List Lep. Ins. B. M.* viii. p. 108. n. 5 (1856) (Espirito Santo;—Mus. Brit.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 538. n. 10 (1877).

Perigonia continua, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 324. n. 6 (1875); Bönningh., *Iris* xii. p. 133. n. 73 (1899) (Rio de Jan.).

Perigonia distans Boisduval, *l.c.* sub n. 6 (1875) (*nom. nax. superrac.*).

Perigonia (?) continua, Kirby, *Cat. Lep. Het.* i. p. 637. n. 13 (1892) (Brazil).

♂. Hinder edge of the mesothoracic tegula almost pure white; pronotum without darker transverse line; anterior upper part of mesothoracic tegula without spot. Forewing, *above*, with the lines in basal costal area absent or vestigial;

antemedian band filled in with black, very oblique ; stigma rather large, dot in front of it distinct ; apical black halfmoon not distinctly separate from the black submarginal area ; yellow area of hindwing extending to abdominal margin. Tenth abdominal segment differing from that of *nictitans* in the tergite being shorter and, at apex, broader, and in the sternite being more strongly curved at end and not being dilated into a tooth in middle, resembling in the latter respect the sternite of *N. riscus* (Pl. XLI. f. 25). Harpe sharply truncate, or (*type*) the ventro-apical edge slanting. Whip of penis-sheath long, about as long as the sheath itself ; left lobe or sheath evenly rounded ; armature of penis-funnel symmetrical as in *nictitans*, with one strongly dentate process on each side, these processes leaning towards each other, and a low ventral ridge which is triangularly raised at each side.

Hab. Brazil : Espirito Santo to Parana.

In the Tring Museum 1 ♂ from Castro, Parana (E. D. Jones).

355. **Nyceryx alophus.**

**Perigonia nephus* var. *alophus* Boisduval, *Spec. Gén. Lép. Het.* i. p. 323. sub n. 5 (1875) (Bahia ;— coll. Charles Oberthür).

♂ ♀. Fringe of mesothoracic tegula not quite so white as in *continua*, pronotum and anterior part of mesonotum more or less variegated with brown ; forewing more variegated than in *continua*, owing to the lines being more distinct ; antemedian band filled in with black (*type*) or not : stigma narrow, elongate ; an abbreviated subbasal blackish band. Yellow area of hindwing reaching to abdominal margin.

♂. (Only *alophus alophus* dissected). Tenth segment and harpe as in *continua*. Whip of penis-funnel short ; armature of penis-funnel (Pl. LIII. f. 45) symmetrical ; a short, heavily dentate process at each side of the funnel, and a longer, compressed, apically rounded and slightly widened process which curves mesiad and is densely beset with minute teeth.

Hab. Bahia to Buenos Ayres and S.E. Bolivia.

Two subspecies :

a. N. alophus alophus.

**Perigonia nephus* var. *alophus* Boisduval, *l.c.* (Bahia).

Perigonia nephus var. *a. P. alophus*, Kirby, *Cat. Lep. Het.* i. p. 637. sub n. 7 (1892).

Perigonia nephus, Bönninghausen, *Iris* xii. p. 133. n. 72 (1899) (Rio de Janeiro).

♂ ♀. This is the Brazilian form, which is rather darker than the following subspecies.

Hab. Bahia to Parana, Brazil.

In the Tring Museum 5 ♂♂, 1 ♀ from : Espirito Santo ; Sao Paulo ; Castro, Parana (E. D. Jones).

b. N. alophus ixion.

Perigonia ixion Burmeister, *Descr. Rép. Argent.*. v. p. 345. 515 (1878) (Paraguay ; Buenos Ayres) ; Kirby, *Cat. Lep. Het.* i. p. 637. n. 8 (1892).

Perigonia nephus, Burmeister, *l.c. Atlas* p. 29. t. 10. f. 6 (1879) (S. Cruz de la Sierra, Bol., Gran Chaco).

♂ ♀. Paler than the previous subspecies ; antemedian band of forewing not filled in with black. Whether this form is constantly different we do not know. We have seen only a few specimens.

Hab. Argentina, northward to Bolivia and Paraguay.

In coll. Charles Oberthür 1 ♂, 1 ♀ from Zarate, Argentina (Kinkelin).

Burmeister's figure does not quite agree with the specimens which we consider to be *ixion* ; we believe the figure to be incorrect.

356. Nyceryx nephus.

**Perigonia nephus* Boisduval, *l.c.* p. 323. n. 5 (1875) (Brazil ;—coll. Charles Oberthür); Butl., *Trans. Zool. Soc. Lond.* ix. p. 633 (1877) ; Kirby, *l.c.* n. 7 (1892).

♂. The type is unique ; we have not seen another specimen. Very close to *alophus* in colour, marginal band of hindwing broader, traces of brown spots ; disc of forewing below ochraceous between the lines. Whip of penis-sheath rather longer than in *alophus*, with more teeth ; left ridge of sheath abruptly ending distally, not evenly rounded ; the teeth of the right side on a small ridge ; armature of penis-funnel differing in there being no small process, but only one long one at each side, this broader at end than in *alophus* and close to the funnel. Harpe acuminate, upper margin slanting distally.

Hab. Brazil, probably Province of Rio de Janeiro.

357. Nyceryx riscus.

**Enyo riscus* Schaus, *Ent. Amer.* vi. p. 20 (1890) (Mexico ;—coll. Schaus) ; Druce, *Biol. Centr. Amer., Lep. Het. Suppl.* p. 302. n. 2 (A). t. 66. f. 3 (1896) (partim ; Mexico : Jalapa, Orizaba ; Guatemala).

Triptogon riscus, Kirby, *Cat. Lep. Het.* i. p. 644. n. 6 (1892).

Pachygonia creusa Rothschild (Staud. in lit.), Nov. Zool. i. p. 665 (1894) (*nom. nud.*).

♂ ♀. Variable in size, but always smaller than *stuarti*, and paler, with the apex of the forewing distinctly sinuate. In this and the preceding species the stigma of the forewing is indistinct, with grey centre, and there is always a rather obvious black dot in front of it.

♂. Tenth segment about as broad as in *Sesia tantalus* (Pl. XLI. f. 25), the lobes not nearly so widely apart as in *stuarti* ; tergite much less twisted, and more evenly curved ventrad, sharply pointed in side-view ; sternite different in shape from that of *stuarti*, dilated before the hook, somewhat more so than in *magna* (Pl. XLI. f. 26), less than in *nictitans* (Pl. XLI. f. 24). Harpe a little shorter than in *stuarti*, with a few nothes at the end. Penis-sheath (Pl. LIII. f. 42) without whip, ending in a triangular, not movable process, which is densely dentate at the tip and along the right edge.

♀. Vaginal plate as in *stuarti*, apical margin more rounded in middle.

Hab. Mexico to Bolivia and Sao Paulo.

In the Tring Museum 11 ♂♂, 5 ♀♀, from : Jalapa, iv. vi., and Orizaba, iv. vi. (Schaus) ; Honduras ; Carpe, Venezuela (Mocquerys) ; Cucuta, Venezuela ; Merida, Venezuela (Briceno) ; San Augustin, Mapiri R., Bolivia, 3500 ft., vi. ix. 1895 (Maxwell Stuart) ; Bauru, Sao Paulo (Dr. Hempel).

358. Nyceryx stuarti.

**Pachygonia stuarti* Rothschild, Nov. Zool. i. p. 665 (1894) (R. Cachyaco ;—Mus. Tring) ; id., *l.c.* ii. t. 9. f. 11 (1895).

Enyo riscus, Druce, *Biol. Centr. Amer., Lep. Het. Suppl.* p. 302. n. 2 (A) (1896) (partim).

♂ ♀. Larger than *riscus*, with which it has been confounded.——Forewing, above, darker, the discal lines more strongly curving costad, apex truncate, *not* sinuate.——Hindwing : yellow colour more restricted, in ♀ less extended yellow

than in ♂, as is also the case in *riscus*, the yellow abdominal margin of ♀ almost separated from the yellow anterior area.

♂. Tenth abdominal segment (Pl. XLII. f. 10) *very* broad, the lobes strongly curving downwards ; tergite curving downwards and inwards, narrowing to apex in side-view (Pl. XLII. f. 11), twisted, not pointed ; lobes of sternite projecting vertically ventrad and then curving evenly distad, horn-shaped, dilated at base, the dilated part carinate on the inner surface, the hook finely channelled. Harpe (Pl. XLVII. f. 3) produced into a slender, tapering process. Penis-sheath (Pl. LIII. f. 41) without whip, ending in a slightly curved, conical, pointed, not movable process ; *no* teeth. Penis-funnel without armature.

♀. Vaginal plate rounded triangular ; orifice open, the edges raised.

Hab. Peru ; Bolivia ; probably of wider distribution.

In the Tring Museum 2 ♂♂, 1 ♀ from : Rio Cachyaco, Prov. Iquitos, Peru (*type* ; Stuart) ; Bolivia (Garlepp).

CVI. PERIGONIA.—Typus : *stulta*.

Sphinx, Fabricius (*non* Linné, 1758), *Gen. Ins.* p. 272 (1777).
Perigonia Herrich-Sch., *Aussereur-Schm.* i. (1854) (*nom. indescr.!*) ; Walk., *List Lep. Ins. B. M.* viii. p. 100 (1856) (partim ; type : *lusca* Walk. partim = *stulta* H.-S.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 320 (1875) (partim).
Macroglossa, Lucas, in Sagra, *Hist. Cuba* vii. p. 289 (1856).
Stenolophia Felder, *Reise Novara*, *Lep.* t. 82 (1874) (*nom. indescr.!*).
Pachygonia, Burmeister (*non* Butler, 1877), *Descr. Rép. Argent.* v. p. 356 (1878).

♂ ♀. Palpi prominent, rounded in dorsal and in lateral view. Scaling raised to a crest on occiput, the crest divided anteriorly in perfect specimens. Antenna slender, not incrassate distally, hook rather short and abruptly curved, end-segment individually variable in length, equalling one, two, or three previous segments. Spines at edges of abdominal segments strong, arranged in three or four rows, the proximal spines longer than broad ; sixth sternite of ♀ transverse, entire apical edge spinose, mesially slightly concave ; anal tuft truncate in ♀, bisinuate, with the narrow mesial part prolonged in ♂. Legs normally scaled ; midtarsus with comb. Forewing pointed, discal edge convex in middle. SC^2 and R^1 of hindwing from upper angle of cell, R^3 and M^1 close together, D^3 very oblique, lower angle of cell sharply acuminate.

♂. Tenth segment of the same type as in *Sesia*, the tergite and sternite being divided each into two lobes (Pl. XLII. f. 12—15). Clasper long, narrow, curving upwards, apex obtuse ; harpe short ; a small ridge above its base, bearing short, stout, curved spines (Pl. XLVII. f. 4. 5. 6) ; *no* friction-scales on outer side. Penis-sheath ending in a whip of variable length, armed with short tooth-like spines, similar spines on the sheath near the base of the whip (Pl. LIV. f. 6. 7).

Early stages not known.

Hab. Tropical and Subtropical America : Bahamas to Buenos Ayres northward into the United States.

Eight species.

Key to the species :

a. Yellow area of hindwing extended to base . . . *b*.
Yellow area of hindwing not extended to base, or hindwing without yellow band . . . *d*.

b. Forewing above with white oblique apical line	359.	*P. divisa.*
Forewing above without white oblique apical line		*c.*
c. Forewing, above, with sharply marked brown postdiscal line running straight across veins from costal margin to tip of M^1, and then continued along edge of wing to hinder angle	360.	*P. grisea.*
Forewing without a sharply marked postdiscal line		*d.*
d. First segment of palpus with white side-line	361.	*P. pallida.*
First segment of palpus without white side-line	362.	*P. stulta.*
e. Antemedian band of forewing sharply limited distally, no yellow area on hindwing	366.	*P. glaucescens.*
Antemedian band of forewing gradually shading off distally, at least in front		*f.*
f. Hindwing with yellow anal patch, or the yellow discal band reduced	363.	*P. lusca.*
Hindwing without yellow anal patch, yellow discal band present, black submarginal line of forewing evenly curved	364.	*P. lefebraei.*
Like *lusca*, but forewing below with yellow discal patch	365.	*P. jamaicensis.*

359. **Perigonia divisa.**

Perigonia spec., Herrich-Sch., *Corresp. Bl.* p. 57 (1865) (Cuba).

Perigonia divisa Grote & Rob., *Proc. Ent. Soc. Philad.* v p. 153. n. 26 (1865) (Cuba ; *nom. indescr.*). Grote, *Ann. Lyc. N. York* viii. p. 199 (1867) (Cuba) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 532. n. 2 (1877) ; Gundl., *Contr. Ent. Cubana* p. 178 (1882) (Cárdenas, Cuba) ; Kirby, *Cat. Lep. Hét.* i. p. 636. n. 2 (1892) (Cuba).

♂. Forewing above with a straight black discal band, and a sharply marked, white line extending from apex of wing obliquely to R^3. Harpe similar to that of *P. grisea*, but more rounded truncate ; patch of spines also as in *grisea*. Penis-sheath similar to that of *jamaicensis*, a series of teeth at apex on right side ; whip shorter than in *jamaicensis*, with dispersed teeth from base to tip.

Hab. Cuba.

A ♂ in the Berlin Museum.

360. **Perigonia grisea** spec. nov. (Pl. X. f. 6, ♂).

♂ ♀. Body and wings grey above and below. Scaling of antenna darker except beyond middle, where there are some scattered creamy scales ; an indistinct mesial line on occiput and pronotum ; a fine border-line on mesothoracic tegula and tips of apical scales of abdominal segments brownish ; underside of abdomen partly pale testaceous, this colour much shaded with dirty grey.

Wings, *upperside*.——Forewing : sharply angulated at R^3, deeply sinuate between R^3 and SM^2 ; a straight line crossing the wing midway between M^1 and M^2, preceded by another straight, but very feeble line ; between this and base a

zigzag line, which consists of four partitions being distally dentate upon M and SM^2 and proximally upon (SM^1), and by a subbasal line, which is distinct only behind cell ; a double stigma, the upper dot minute : on the disc there are two parallel, somewhat S-shaped, slightly lunulated lines, followed by an indistinct third one ; then comes a lunulated line running straight from the costal to the internal margin, reaching the latter about 2 mm. from angle, the lunules composing it convex distally; parallel with it is a heavy, band-like line, which is marginal from M^1 to anal angle ; an indistinct apical dash, followed behind SC^5 by a curved line ; all these lines blackish olive.——Hindwing : a large yellow discal area, nearly as in *stulta*, dentate externally, not reaching base ; abdominal fold with a yellow distal patch ; marginal area of wing grey before anal angle, marked with a thin line about 2 mm. from edge, and a very indistinct one a little farther proximad.

Underside with the testaceous ground-colour coming through, especially on the forewing, discal lines as in the allied species.

♂. Tenth segment (Pl. XLII. f. 12) resembling that represented by Pl. XLII. f. 9, shorter, tergite somewhat widened apicad in a lateral view, ending in a short tooth. Harpe (Pl. XLVII. f. 4) produced into a short, pointed process. Penis-sheath (Pl. LIV. f. 6) with two or three teeth at the right side, one at the base of the whip, and two at the tip of the same, whip rather shorter than in the following insects (*lusca*, etc.).

♀. Vaginal plate as in *stulta*.

Hab. Bolivia ; Peru.

In the Tring Museum 5 ♂♂, 1 ♀ from : Rio Songo to R. Suapi, Bolivia, 1100 m., iii.—vi. (Garlepp) (*type*) ; San Augustin, Mapiri R., Bolivia, 3500 ft., ix. (Stuart) ; Peru.

361. **Perigonia pallida** spec. nov.

♂♀. Similar to *stulta*, paler, wings narrower. First segment of palpus with white lateral line. Distal margin of forewing more broadly rounded in middle ; brown border of hindwing narrower, testaceous in front, disc of a deeper yellow tint than in *stulta*.

♂. Tenth abdominal segment as in *stulta*. Harpe truncate (Pl. XLVII. f. 5) as in that species, but the patch of curved spines above it much more extended than in any other species. Penis-sheath as in *grisea*, but the whip much longer.

♀. Vaginal plate (Pl. XLI. f. 4) broadly rounded ; mouth of vagina postmedian, the edges raised, the proximal edge sinuate mesially.

Hab. South America : Venezuela and Argentina.

In the Tring Museum 5 ♂♂, 5 ♀♀, from : Merida, Venezuela (*type*) ; La Plata (town), Argentina.

362. **Perigonia stulta.**

**Perigonia stulta* Herrich-Sch., *Auss. Schm.* i. f. 106 (1854) (coll. Staudinger) ; id., *l.c.* p. 59 (1858) (Am. aequin.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 321. n. 2 (1875) (N. Fribnrgo) ; Butl., *Trans. Zool. Soc. Lond.* iv. p. 533. n. 7 (1877) (Cuba) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 3. n. 3 (1881) (Chiriqui) ; Kirby, *Cat. Lep. Het.* i. p. 637. n. 11 (1892).

Perigonia lusca, Walker (*non* Fabricius, 1777), *List Lep. Ins. B. M.* viii. p. 101. n. 1 (1856) (partim) ; Clem., *Proc. Ac. N. Sc. Philad.* iv. p. 138. n. 15 (1859) (partim) ; Morris, *Cat. Lep. N. Am.* p. 17 (1860) (partim) ; Druce, *l.c.* p. 3. n. 1. t. 3. f. 5 (1883) (partim) ; Kirby, *l.c.* (1892) (partim).

Perigonia lusca ?, Bönninghausen, *Iris* xii. p. 133. n. 71 (1899) (Rio de Jan.).

♂♀. Somewhat variable in colour, body and forewing in some specimens more

variegated with grey than in others ; yellow area of hindwing rather constant, always reaching to base ; the yellow patch at anal angle is rather large in some individuals, vestigial in others. The black submarginal line of the forewing, above, distinct in *lusca*, is barely vestigial at apex and in middle ; a greyish, curved, subtriangular shade extends from costal margin to end of R^3, bordering a halfmoon-shaped darker distal marginal space. The *underside* is generally uniform in colour, with the submarginal line of the forewing distinct at least from tip of wing to R^2, bordered grey distally. Distal margin of forewing more sharply angulated at R^3 in some specimens, such individuals having generally also a small tooth at R^2.

♂. Sexual armature as in *grisea*, differing from that of *pallida* in the much smaller patch of spines on the inner surface of the clasper above the harpe, and in the much shorter whip of the penis-sheath.

♀. Vaginal plate (Pl. XLI. f. 5) also as in *grisea*, more triangular than in *pallida* ; vaginal orifice subapical, transverse, covered by a broad flap ; proximal part of plate almost regularly folded.

Hab. Guatemala to Bolivia and Rio de Janeiro.

In the Tring Museum 56 specimens from : Guatemala ; Chiriqui ; Paramba, Ecuador, 3500 ft. iv. '97, dry season (Rosenberg) ; Chanchamayo, Peru ; St. Domingo, S.E. Peru (Ockenden) ; Mapiri R., Bolivia, viii. ix. (Stuart) ; Rio de Janeiro.

363. Perigonia lusca.

Sphinx lusca Fabricius, *Gen. Ins.* p. 272 (1777) (Am. merid.) ; Goeze, *Ent. Beytr.* iii. 2. p. 209. n. 22 (1780) ; Fabr., *Spec. Ins.* ii. p. 140. n. 5 (1781) (Am. merid. insulis !) ; id. *Mant. Ins.* ii. p. 92. n. 5 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2372. n. 51 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 356. n. 6 (1793).

Perigonia lusca, Walker, *List Lep. Ins. B. M.* viii. p. 101. n. 1 (1856) (partim) ; Clem., *Proc. Ac. Nat. Sc. Philad.* iv. p. 138. n. 15 (1859) (synon. partim ; Mexico ; S. Am. ; W. Indies) ; Morris, *Cat. Lep. N. Am.* p. 17 (1860) (partim) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 160. n. 1 (1862)-(partim) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 152. n. 23 (1865) ; Boisd., *Cons. Lép. Guatem.* p. 67 (1870) ; id., *Spec. Gén. Lép. Hét.* i. p. 325. n. 9 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 532. n. 5 (1877) ; Druce, *Biol. Centr. Am., Lep. Het.* i. p. 3. n. 1 (1881) ; Kirby, *Cat. Lep. Het.* i. p. 636. n. 6 (1892) ; Druce, *l.c. Suppl.* p. 299 (1896) (Mexico ; Guatemala ; Chiriqui).

**Perigonia restituta* Walker, *l.c.* xxxi. p. 32 (1864) (Mexico ;—Mus. Brit.).

There is apparently no constant difference by which the various forms here united to one species can be distinguished ; we have vainly endeavoured to find constant distinguishing characters. The sexual armature, apart from individual variation, is the same in all of them ; but that is not an argument of weight in the present genus, as species so different in colour as *stulta* and *grisea* agree also in these organs. The details of the shape and colour of the wings which have served the various authors as specific characters are unreliable, there occurring so many intermediate specimens that it is impossible to say where one so-called species ends and another begins. The difficulty of dealing with these insects is increased by the lack of sufficient material from the West Indies. A larger series of individuals from the islands may possibly prove that *lefebvrei* and *jamaicensis* are also not specifically distinct.

♂♀. Yellow band of hindwing not extended to base, seldom as broad as the blackish distal border of the wing, often reduced, not rarely obliterated. Black submarginal line of forewing curving from apex to hinder angle always distinct ; a conspicuous, mostly straight, brown antemedian line crossing M distally of M^2,

gradually shading off distally, this brown scaling forming a band which narrows costad. Fifth abdominal tergite often with a distinct grey shade ; this grey scaling does not represent a rudiment of the white belt of *Sesia tantalus*, etc., which is situated upon the fourth tergite ; basal sternites also often distinctly paler than the more distal segments.

♂. Tenth segment similar to that of *grisea* (Pl. XLII. f. 12) ; tergite ending in a short, blunt tooth ; it is apically not dilated externo-laterad as in *jamaicensis* (compare Pl. XLII. f. 13). Harpe as in *jamaicensis* (Pl. XLVII. f. 6) ; clasper much narrower. Penis-sheath as in *jamaicensis*, the number of tubercles individually variable.

♀. Vaginal orifice free, postmedian, slightly asymmetrical in position, its edges a little raised ; vaginal plate triangular, somewhat folded transversely.

Hab. Mexico to Argentina ; West Indies.

Key to the varieties :

a. Hindwing below with the abdominal area more or less extended yellow . . .	*b.*
Hindwing below with the abdominal area not yellow	*c.*
b. Black submarginal line of forewing above evenly curved . . .	*a'. P. lusca* f. *lusca*
Black submarginal line of forewing above irregular behind . . .	*c'. P. lusca* f. *ilus.*
c. Forewing 25 mm. long or less, strongly rounded convex in middle . .	*b'. P. lusca* f. *passerina.*
Forewing longer, less convex in middle	. . *d.*
d. Yellow band of hindwing reaching to M^2	*d'. P. lusca* f. *interrupta.*
Yellow band of hindwing reduced .	*e'. P. lusca* f. *restituta.*
Yellow band of hindwing obliterated	*f'. P. lusca* f. *tenebrosa.*

It is possible that the last three forms are one species, and the other three another.

a'. P. lusca f. *lusca.*

Sphinx lusca Fabricius, *l.c.*
Perigonia lusca Grote & Rob., *l.c.* ; Gundl., *l.c.*

♂ ♀. Submarginal line of forewing evenly curved, not strongly angulate as in the other forms ; scaling very pale at straight proximal edge of antemedian band, disc outside this band also pale.——Hindwing with yellow anal patch.

A small form, with which *lefebraei* may be specifically identical.

Hab. Cuba.

In the Tring Museum 2 ♂♂.

b'. P. lusca f. *passerina.*

**Perigonia passerina* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 327. n. 12 (1875) (hab. ?).
Pachygonia lusca, Burmeister, *Descr. Rép. Argent.* v. p. 356 (1878) (Bolivia ; Buenos Ayres) ; id., *l.c.*, *Atlas* p. 29. t. 10. f. 7 (1879).

♂ ♀. Mostly small, like the preceding.——Forewing obtusely angulated in middle, submarginal line very irregular between R^3 and SM^2, not very distinct posteriorly, being more or less merged together with the black marginal scaling ;

yellow anal patch of hindwing large above, but *absent* from underside. Under surface of wings with the reddish ferruginous ground-colour often obscured by olive-wood-brown, sometimes all olive-clay-colour.

Hab. Matto Grosso ; Paraguay ; Bolivia.

In the Tring Museum 15 specimens from : Miranda, Matto Grosso, January 1899 (Maxwell Stuart); Curumba, Matto Grosso, January 1899 (M. Stuart) ; Reyes, R. Beni, Bolivia, July 1895 (Maxwell Stuart) ; Sapucay, near Villa Rica, Paraguay (Foster).

c'. P. lusca f. *ilus.*

**Perigonia ilus* Boisduval, *Cons. Lép. Guatemala* p. 66 (1870) (Honduras ; Mexico) ; id., *Spec. Gén. Lép. Hét.* i. p. 326. n. 10 (1875) (Mexico; Guatemala) ; Kirby, *l.c.* n. 4 (1894); Bönningh., *Iris* xii. p. 132. n. 70 (1899) (Rio de Janeiro).

♂ ♀. Like the preceding, larger.——Hindwing below with yellow abdominal area ; disc of both wings more extended reddish ferruginous.

The type of *ilus*, a ♂, has a rather dark forewing, and the yellow band of the hindwing is narrow. In the type of *passerina*, also a ♂, the yellow band is broader than in the average specimens of *ilus*. Both types in coll. Oberthür.

Hab. Mexico to Matto Grosso ; probably also in Southern Brazil.

In the Tring Museum 60-odd specimens from : Mexico ; Honduras ; Colombia ; Peru ; Bolivia ; Matto Grosso ; Venezuela ; Brit. Guiana.

We add that this form was found in Matto Grosso at the same time as the previous one.

d'. P. lusca f. *interrupta.*

Perigonia lusca, Walker, *l.c.* viii. p. 101. n. 1 (1856) (partim) ; Butl., *l.c.* p. 532. n. 5 (1877) ; Dew *Mitth. Münch. Ent. Ver.* i. p. 91 (1877) (Porto Rico) ; Kirby, *l.c.* n. 6 (1892) (partim) ; Hamps *Ann. Mag. N. H.* (7). viii. p. 251 (1901) (Nassau, Bahamas).
**Perigonia interrupta* Walker, *l.c.* xxxi. p. 29 (1864) (Mexico ; Guatemala ; Haiti).
Macroglossa doto Schaufuss, *Nunq. Otios.* i. p. 21 (1870) (" Afr." err. loc. !).
Perigonia restituta, Druce, *l.c. Suppl.* p. 292 (1896) (partim).

♂ ♀. Forewing narrower than in the preceding forms, distal margin less convex in middle, black submarginal line more evenly curved, less irregular behind, and not so close to the margin.——Hindwing shorter, distal margin almost or quite straight down to M^2, apex acute in many specimens, yellow band as in *ilus*, or rather narrower, yellow anal patch more or less distinct above, absent from underside.

Hab. Mexico to Bolivia ; West Indies ; Bahamas ; doubtless everywhere in the range of *lusca*, but not so common as *ilus*.

In the Tring Museum 40-odd specimens from : Bahamas (Sir G. Carter); Florida ; Mexico : Honduras ; Colombia ; Peru ; Bolivia ; Venezuela.

e'. P. lusca f. *restituta.*

Perigonia lusca, Walker, *l.c.* (partim).
**Panacra restituta* id., *l.c.* xxxi. p. 32 (1864) (Mexico ;—Mus. Brit.) ; Butl., *l.c.* n. 3 (1877) (Mexico ; Venezuela ; Para) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 3. n. 2. t. 3. f. 6 (1881) ; Kirby, *l.c.* n. 3 (1892) ; Druce, *l.c. Suppl.* p. 299 (1896) (partim).
Perigonia restituta, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 177 (1865).
Macroglossa doto v. *affinis* Schaufuss, *Nunq. Otios.* i. p. 21 (1870) (Venez.).

♂ ♀. Like the preceding, but the yellow band of the hindwing reduced, yellow anal spot small, vestigial, or absent.

Hab. Mexico to the Amazons.

In the Tring Museum 20-odd specimens from: Mexico; Honduras; Costa Rica; Colombia; Veneznela.

f. P. lusca f. *tenebrosa.*

**Stenolophia tenebrosa* Felder, *Reise Novara, Lep.* t. 82. f. 3 (1874) (Mus. Tring); Butl., *l.c.* p. 531 (1877) (a *Perigonia?*); Kirby, *l.c.* p. 637. n. 1 (1892).
Perigonia? tenebrosa, Boisduval, *l.c.* p. 325. n. 8 (1875).
Stenolophia restituta, Rothschild, Nov. Zool. i. p. 69 (1894).

♂♀. Like f. *restituta*, but hindwing with the yellow band and the yellow anal patch obliterated.

Hab. Northern parts of South America.

In the Tring Museum 1 ♂, 3 ♀♀, from: Venezuela; Amazons (*type*).

Specimens without any yellow scales on the hindwing are rare; the intergradations between this extreme form and *restituta* with narrow band are commoner.

364. Perigonia lefebraei.

Macroglossa lefebraei Lucas, in Sagra, *Hist. Cuba* vii. p. 289 (1856) (Cuba).
Macroglossa lefebvrii (!), Herrich-Sch., *Corresp. Bl.* p. 147 (1863).
Perigonia lefebvrii (!), id., *l.c.* p. 56 (1865); Grote, *Proc. Ent. Soc. Philad.* v. p. 48 (1865) (descript.); id. & Rob., *ibid.* p. 153. n. 24 (1865).
Perigonia lefebvrei (!), Butler, *Trans. Zool. Soc. Lond.* ix. p. 532. n. 6 (1877); Kirby, *Cat. Lep. Het.* i. p. 637. n. 9 (1892).
Perigonia lefebraei, Gundlach, *Contr. Ent. Cubana* p. 178 (1882) (larva like that of *lusca*).

♂♀. Differs from *P. lusca* f. *lusca* in the fuscous antemedian band of the forewing being vestigial only, and in the yellow anal patch of the hindwing being absent. Sexual armature as in *P. lusca.*

Larva on *Rubiaceae* (Gundlach, *l.c.*).

Hab. Cuba.

In the Tring Museum 2 ♂♂, 1 ♀, from: Cuba; Haiti.

365. Perigonia jamaicensis.

**Perigonia jamaicensis* Rothschild, Nov. Zool. i. p. 69 (1894) (Jamaica;—Mus. Tring).

♂. Forewing, below, with a large, ill-defined, yellow patch posteriorly on disc. Tenth tergite rounded at end in side-view (Pl. XLII. f. 13), the apex curved laterad (Pl. XLII. f. 14). Clasper very broad for a species of this genus, much broader than in *lusca*; harpe truncate (Pl. XLVII. f. 6). Penis-sheath (Pl. LIV. f. 7) with a series of teeth on the right side, and several teeth at the base of the whip.

Hab. Jamaica.

In the Tring Museum 3 ♂♂ from Jamaica.

366. Perigonia glaucescens.

**Perigonia glaucescens* Walker, *List Lep. Ins. B.M.* viii. p. 103. n. 5 (1856) (Haiti;—Mus. Brit.); Clem., *Proc. Ac. N. Sc. Philad.* iv. p. 138. n. 17 (1859); Morris, *Cat. Lep. N. Am.* p. 17 (1860) (Mexico *ex err.*); Clem., in Morris, *Syn. Lep. N. Am.* p. 160. n. 3 (1863); Boisd., *Spec. Gén. Lép. Hét.* i. p. 328. n. 14 (1875) (Haiti); Butl., *Trans. Zool. Soc. Lond.* ix. p. 532. n. 1 (1877) (Haiti); Kirby, *Cat. Lep. Het.* i. p. 636. n. 1 (1892); id., in Allen's *Nat. Libr., Lep.* iv. p. 12. t. 97. f. 1 (1897).

♀. Only one specimen known. Kirby's figure, though bad like all figures in that book, gives one nevertheless an idea of what *glaucescens* looks like. The white belt of the abdomen is far too prominent in the figure, the belt not being more distinct than it is in many individuals of *P. lusca*. The species resembles the form *tenebrosa* of *lusca*, but is doubtless distinct. Thorax greenish yellow above, side-tufts of abdominal segments 5 and 6 white-tipped ; underside of body paler than in *P. lusca* f. *tenebrosa*. Forewing, above, with a broad antemedian band, which is sharply defined distally as well as proximally ; stigma not distinct, exactly at the edge of the band ; brown submarginal line evenly curved, somewhat dilated in middle, not angulate, beginning at costal margin about 2 mm. from tip of wing. Hindwing without a trace of a yellow band, with a submarginal pink-buff patch before anal angle. Distal border of wings below not brown ; submarginal line of forewing more proximal than in *lusca*.

Hab. Haiti.

One specimen (*type*) in the British Museum.

CVII. EUPYRRHOGLOSSUM.—Typus : *sagra*.

Macroglossa, Poey (*non* Ochsenheimer, 1816), *Cent. Lép. Cuba* t. 19 (1832).
Eupyrrhoglossum Grote, *Proc. Ent. Soc. Philad.* v. p. 42 (1865) (type : *sagra*).
Empyrrhoglossum (!), Bönninghausen, *Iris* xii. p. 134 (1899).

♂♀. Differs from *Sesia* in veins SC^4 and SC^5 of the forewing remaining separate at end. Penis-sheath without spines on the right side.

Hab. Tropical America.

Two species :

Forewing with a white semi-transparent spot R^3—M^1 367. *E. sagra*.
Forewing without a white semi-transparent spot . 368. *E. corvus*.

367. Eupyrrhoglossum sagra.

Macroglossa sagra Poey, *Cent. Lép. Cuba* t. 19 (1832) (Cuba) ; Walk., *List Lep. Ins. B. M.* viii. p. 89. n. 6 (1856) (Colombia ; Brazil) ; Clem. *Journ. Ac. Nat. Sc. Philad.* iv. p. 132. n. 7 (1857) (S. Am. ; W. Indies) ; Morris, *Cat. Lep. N. A.* p. 17 (1860) ; Clem., in Morris, *Syn. Lep. N. A.* p. 152. n. 4 (1862) ; Herr.-Sch., *Corresp. Bl.* p. 56 (1865) (Cuba) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 360. n. 46 (1875) (Cuba ; R. Grande) ; Gundl., *Contr. Ent. Cubana* p. 175 (1881) (*l.* on *Rubiaceae*) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 333 (1882) (Paramaribo) ; Bönningh., *Iris* xii. p. 135. n. 77 (1899) (Rio de Jan.).
Eupyrrhoglossum sagra, Grote, *Proc. Ent. Soc. Philad.* v. p. 43 (1865) (Cuba) ; id. & Rob., *l.c.* p. 150. n. 9 (1865) ; Grote, *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 531. n. 1 (1877) (Brazil ; Colombia) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 2. n. 1 (1881) (Chiriqui ; Cuba : Colombia ; Ecuador ; Upp. Amaz.) ; Kirby, *Cat. Lep. Het.* i. p. 636. n. 1 (1892) (Cuba) ; Druce, *l.c. Suppl.* p. 298 (1896) (Mexico).
Macroglossa harpyia Schaufuss, *Nunq. Otios.* i. p. 22 (1870) (Venezuela).

♂♀. Head with a low mesial crest. Antenna slender in both sexes, not clubbed, hook long, gradually tapering. Thorax mouse-grey, sides brown, the two colours sharply separated, mesial line also brown. Forewing more variegated than is *Sesia ceculus*, blackish subbasal band with a straight grey outer border ; a semi-transparent discal spot R^3—M^1, more distal than in *Sesia ceculus* and *tantalus* ; underside with ochraceous halfmoons in discal postcostal area, being the interspaces of faintly marked brown lines, one or more such spots often also between M^1 and (SM^1) ; these spots correspond to the semitransparent spots of *Sesia fadus* and

allies, and are homologous to the similar spots of *Nycerya*. The narrow yellow band of the hindwing of nearly even width, sometimes narrowed before middle, more or less indicated below on disc as well as before abdominal margin. Fringe of hindwing yellow above, less so below. SC^4 and SC^5 of forewing not fused at end, SC^4 ending at costal margin a little before apex of wing.

♂. Tenth sternite slender, hooks not strongly curved. Harpe somewhat projecting at end. Penis-sheath very peculiar (Pl. LIV. f. 13): apex of sheath triangularly narrowed, right edge of this acuminate part with a row of teeth, apex beset all round with similar teeth, this portion homologous to the whip of the other species; instead of the spines found at the left side in *Sesia tantalus*, etc., we find in *E. sagra* a very long thin process situated at the edge of the mouth of the sheath; it is a prolongation of the wall of the sheath itself, not a spine-like excrescence, and is accordingly flat, with one side concave corresponding to the inner surface of the sheath, as is the case with the whip of the other species. This process is homologous with the tubercled ridge found in *Nycerya* (compare Pl. LIV. f. 1—5); it curves in an irregularly raised spiral, and bears about twenty-five rather regularly distributed long branches, which are all situated on the same (external) side and are of nearly the same length. The peculiar organ is generally visible without dissection, projecting from the scaling of fan-tail. It is very brittle, breaking off easily close to the sheath.

♀. Vaginal orifice (Pl. XLI. f. 1) shifted proximad and laterad, lying behind a curved transverse fold.

Hab. Cuba; Mexico to Rio Grande do Sul.

In the Tring Museum 30-odd specimens from: Cuba; Honduras; Chiriqui; Rio Demerara; San Augustin, Mapiri R., Bolivia, 3500 ft., ix. '95 (Stuart); Miranda, Matto Grosso, i. '99 (Stuart); Paraguay (Dr. Bohls); Rio de Janeiro.

368. **Eupyrrhoglossum corvus.**

**Macroglossa corvus* Boisduval, *Cons. Lép. Guatem.* p. 66 (1870) (Nicaragua;—coll. Charles Oberthür); id., *Spec. Gén. Lép. Hét.* p. 361. n. 47 (1875) (R. Magdalena, Col.; Nicaragua).
(?) *Eupyrrhoglossum ? reculus* Butler, *Trans. Zool. Soc. Lond.* ix. p. 531. n. 2 (1877).
Eupyrrhoglossum reculus, Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 2. n. 2 (1881) (partim).
Eupyrrhoglossum corvus, Kirby, *Cat. Lep. Het.* i. p. 636. n. 3 (1892) (Nicaragua).

♂. The species reminds us, in the colour and shape of the forewing, of *Perigonia lusca* f. *restituta*. Head and thorax without mesial crest. Antenna slender, not at all clubbed, hook quite gradually narrowed; end-segment short, conical, less than three times as long as basally broad. Underside burnt umber colour, shaded with blackish olive; breast, two series of spots on abdominal sternites (proximal sternites also more or less the same colour in middle) and vestiges of spots at the lateral edges of the abdominal tergites orange-buff, palpus below nearly the same colour, rather more ochraceous-tawny, bases of wings and abdominal area of hindwing ochraceous-yellow. SC^4 and SC^5 of forewing not fused at end, remaining separate as in *sagra*.

♂. Tenth sternite with the hook much more suddenly curved than in the other species. Penis-sheath with a long whip, which bears a number of tubercles, being similar to the whip found in the species of *Perigonia* and *Nycerya*; three heavy apical bristles at the right side, preceded by a small number of irregularly-placed tubercles; *no* spines at the left side.

Hab. Nicaragua to Bolivia.

In the Tring Museum 6 ♂♂ from: Huamba, Peru; Chanchamayo, Peru; Cajon, Peru, x. (Garlepp); Rio Songo to Rio Suapi, Bolivia (Garlepp).

Several specimens in coll. Charles Oberthür.

CVIII. SESIA.—Typus: *tantalus*.

Sphinx, Linné, *Syst. Nat.* ed. x. p. 493 (1758) (partim).
Sesia Fabricius, *Syst. Ent.* p. 547 (1775) (partim; type: *tantalus*).
Aellopus Hübner, *Verz. bek. Schm.* p. 131 (1822) (type: *titan*); Grote, *Proc. Ent. Soc. Philad.* v. p. 42 (1865).
Psithyros id., *l.c.* p. 132 (1822) (partim; type: *stellatarum*).
Macroglossum, Swainson, *Zool. Illustr.* iii. t. 132 (1823).
Macroglossa, Walker, *List Lep. Ins. B. M.* viii. p. 88 (1856) (partim).

♂♀. Head broad, without crest. Palpi shortly pointed together in dorsal view, smoothly scaled. Antenna imperceptibly or distinctly incrassate towards hook, or filiform in ♀; hook slender, consisting of more than eight segments; end-segment elongate, but not filiform, varying in length. Spines of abdomen as in *Cephonodes*, *Macroglossum*, etc., spines of first series broad and short (Pl. LXII. f. 11); seventh sternite of ♀ broad, transverse, mesially sinuate, the entire apical edge spinose (Pl. LXIII. f. 6). Scaling of legs normal; hindtarsus compressed, spines shifted towards outer side, besides the four rows there are many intermediate spines, all stout; midtarsus with proximal spines of fourth row thinner and longer than the others, forming a comb; mid- and hindmerum strongly angulate. Distal margins of wings entire; SC^4 and SC^5 of forewing fused at end; SC^2 and R^1 of hindwing from angle of cell, R^3 and M^1 close together, cross-veins oblique.

♂. Anal segment and clasper very constant; tenth tergite hairy, divided into two long lobes (Pl. XLII. f. 8. 9), which are somewhat twisted and compressed, so that the upper surface is narrower than the sides; apex more or less rounded, with a slight carina on the inner surface ending at a notch; ventral edge concave before end, the lobe more or less convex proximally of this shallow sinus. The sternite (Pl. XLII. f. 8. 9, *Nr.*) is also divided into two lobes, which are contiguous with the dorsal lobes; each is sharply pointed and curved dorsad and laterad at end, the tip lying close upon the lateral surface of the tergal lobe. The clasper is long and narrow and curved; the dorsal margin of same is so deeply concave that there remains a wide gap between the clasper and the tenth segment; no friction-scales; harpe vestigial, being indicated by an incrassation of the ventral edge of the clasper; bristles of clasper very long. Penis-sheath with an apical whip and a series or patch of heavy spines at the left side, and two to four apical spines at the right side; the whip is a prolongation of the wall of the sheath; it is flat, somewhat concave on the inner surface; it is armed with some short, blunt, tubercle-like spines, and bears two apical sensory bristles.

♀. Vaginal plate small, triangular, minutely folded, its distal edge incrassate; vaginal orifice not quite mesial, but shifted towards the left side (Pl. XLI. f. 2. 3)

Larva not known: on *Rubiaceae*.

Chrysalis of *tantalus clavipes* shortly described by Edwards; similar in shape to that of *Haemorrhagia thysbe*. The chrysalis figured by Burmeister, *Descr. Rép. Argent., Atlas* t. 11 f. 6, as that of *titan* certainly does not belong here.

Hab. Tropical and Subtropical America, as wanderer northwards to Ohio and New England.

Five species.

Key to the species :

a.	Hindwing with yellow discal band . . .	369. *S. ceculus.*
	Hindwing without yellow discal band	*b.*
b.	Abdomen without white belt on segment 4 . .	370. *S. blaini.*
	Abdomen with sharply marked broad white belt . .	*c.*
c.	White discal spots three in number, the upper one largest, often divided	371. *S. tantalus.*
	White discal spots four or five in number, not divided	372. *S. titan.*
	White discal spots four to seven in number, some of them divided	373. *S. fadus.*

369. Sesia ceculus.

Sphinx ceculus Cramer, *Pap. Ex.* ii. p. 80. t. 146. f. G (1777) (Surinam).
Sphinx stellatarum β *Sphinx ciculus* (!), Gmelin, *Syst. Nat.* i. 5. p. 2387. n. 27 (1790).
Psithyros ceculus, Hübner, *Verz. bek. Schm.* p. 132. n. 1411 (1822).
Macroglossa ceculus, Burmeister, *Sphing. Bras.* p. 73. n. 4 (1856) (Colombia ; Guiana) ; Walk., *List Lep. Ins. B.M.* viii. p. 88. n. 5 (1856) (Para ; Mexico) ; Clem., *Journ. Ac. Nat. Sc. Philad.* iv. p. 132. n. 7 (1857) (S. Am. ; Mexico) ; Morris, *Cat. Lep. N. A.* p. 17 (1860) ; Clem., in Morris, *Syn. Lep. N. A.* p. 151. n. 3 (1862) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 359. n. 45 (1875) (Cayenne ; Brazil ; Colombia) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 351 (1876) (Surinam) ; Bönningh., *Iris* xii. p. 134. n. 76 (1899) (Rio de Jan.).
Eupyrrhoglossum ceculus, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 150. n. 10 (1865) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 2. n. 2 (1887) (Mexico ; Guatemala ; Nicaragua ; Chiriqui ; Colombia ; Ecuador ; Trinidad ; Guiana ; Para) ; Kirby, *Cat. Lep. Het.* i. p. 636. n. 2 (1892) (S. & C. Am.) ; Druce, *l.c. Suppl.* p. 299 (1896) (Brit. Hond. ; Guatem. ; Panama).
Eupyrrhoglossum ? ceculus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 531. n. 2 (1877) (Para ; Mexico).
Eupyrrhoglossum ceculus, Kaye, *Trans. Ent. Soc. Lond.* p. 140 (1901) (Trinidad).

♂ ♀. Variable in size. The discal band of white semitransparent spots of *tantalus* and allies represented above and below by a dot R^3—M^1, which is, however, often absent. Head and thorax as in *tantalus* without mesial crest : SC^4 and SC^5 of forewing fused at end as in *tantalus* ; antenna slenderer, with a longer and less abrupt hook, agreeing with that of *Eupyrrhoglossum sagra*. Yellow band of hindwing narrowed in and before middle, seldom of even width, costal half often partly obsolete. Abdomen with two orange patches, sometimes with only one, base of fifth tergite also often orange laterally.

♂. Penis-sheath (Pl. LIV. f. 14) : a short whip, which is not quite the length of the diameter of the sheath, ending in a tubercle and bearing the usual two apical sensory hairs ; two to four apical spines at the right side ; five to eight spines on the left side arranged in one row, all very long and pointing proximad, differing in this respect remarkably from the corresponding spines of *fadus* and allies.

♀. The small vaginal orifice (Pl. XLI. f. 2) lies in a groove or cavity formed by a rather prominent antevaginal ridge and the apical edge of the vaginal plate ; orifice concealed by the antevaginal ridge in a ventral view, being indicated in figure by a ring of dots.

Early stages not known.

Hab. Neotropical Region : Mexico to Bolivia and Southern Brazil ; not on the West Indies ?

In the Tring Museum 50-odd specimens from : Guatemala ; Colombia ; Venezuela ; Brit. Guiana ; Peru ; Ecuador ; Bolivia ; Blumenau.

370. Sesia blaini.

**Aellopus blaini* Herrich-Sch., *Ausser. Schm.* ii. f. 553 (1869) (Cuba ;—coll. Staudinger) ; Grote, *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (Cuba) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 530. n. 2 (1877) (partim) : Kirby, *Cat. Lep. Het.* i. p. 635. n. 3 (1892) (Cuba).

**Macroglossa aedon* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 357. n. 40. t. 11. f. 1 (1875) (Cuba ;—coll. Charles Oberthür) ; Gundl., *Contr. Ent. Cubana* p. 176 (1881).

Aellopus aedon, Butler, *Trans. Zool. Soc. Lond.* ix. p. 634 (1877).

Macroglossa blaini, Dewitz, *Mitth. Münch. Ent. Ver.* i. p. 91 (1877) (Porto Rico).

♂ ♀. This species combines characters of the pattern of *Euppyrrhoglossum sagra* and *Sesia tantalus*. The mesothorax has long narrow scales, and is marked with a pale vitta near upper margin of tegula. SC^4 and SC^5 of forewing are fused at end.

Hab. West Indies : Cuba ; Jamaica ; Porto Rico.

In the British Museum a ♀ from Jamaica. A pair from Cuba in the collection of Charles Oberthür. A ♀ in the Berlin Museum also from Cuba. *Type* (♀) of *blaini* in coll. Staudinger ex coll. Herrich-Schäffer.

371. Sesia tantalus.

Sphinx tantalus Linné, *Syst. Nat.* ed. x. p. 493. n. 23 (1758) (in calidis regionibus !) ; id., *Mus. Lud. Ulr.* p. 361 (1764) (Ind. or. ! !) ; Houtt., *Naturl. Hist.* i. 11. p. 456. n. 23 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 803. n. 25 (1767) ; Müll., *Naturs.* v. 1. p. 643. n. 25 (1774) ; Cram., *Pap. Ex.* i. p. 107. t. 68. f. F (1775) ; Goeze, *Ent. Beytr.* iii. 2. p. 177. n. 26 (1780) ; Gmel., *Syst. Nat.* i. 5. p. 2386. n. 25 (1790).

(?) *Sphinx ixion* Linné, *Syst. Nat.* ed. x. p. 493. n. 24 (1758) (in calidis region. !) ; Houtt., *Naturl. Hist.* i. 11. p. 456. n. 24 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 803 n. 26 (1767) ; Müll., *Naturs.* v. 1. p. 643. n. 26 (1774) ; Goeze, *Ent. Beytr.* iii. 2. p. 177. n. 25 (1780) ; Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 170. n. 5 (1882).

Sesia tantalus, Fabricius, *Syst. Ent.* p. 547. n. 1 (1775) ("hab." erroneous) ; id., *Spec. Ins.* ii. p. 153. n. 1 (1781) ; id., *Mant. Ins.* ii. p. 98. n. 1 (1781) ; id., *Ent. Syst.* iii. 1. p. 379. n. 1 (1793) ; Turt., *Syst. Nat.* iii. 2. p. 178 (1806).

Sesia ixion, Fabricius, *Spec. Ins.* ii. p. 154. n. 2 (1781) ; id., *Mant. Ins.* ii. p. 98. n. 2 (1787).

Sphinx ixion, Gmelin, *Syst. Nat.* i. 5. p. 2386. n. 26 (1790).

Aellopus tantalus, Aurivillius, *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 141. n. 179 (1882).

The description in a manuscript of Linné referred to by Aurivillius, *l.c.* p. 141, shows that *tantalus* is really the species figured as such by Cramer. But, as no locality is given, it is impossible to say which of the three geographical races, whether one of the Continental ones or that occurring on the West Indian Islands, Linné had before him. The type is not preserved.

The few words by which Linné attempted to characterise *ixion* are quite insufficient to recognise the insect by. This *ixion* may have been a true *Macroglossum*, or a *Sesia*, or something else : Fabricius was perhaps right in referring it to *tantalus*.

The true specific characters of *tantalus* and its near allies have not been recognised, and most authors have considered the insects only doubtfully distinct, or not distinct at all. However, a closer research showed us not only that the three insects figured by Cramer as *tantalus*, *fadus*, and *titan* are distinct from one another, but that *tantalus* consists of three different subspecies.

♂ ♀. Smaller than *fadus* and *titan*. Median band of forewing above vestigial, without distinct white spots, or with only one minute spot M^1—M^2 ; discal band consisting of three spots R^1—M^1, the uppermost generally distinctly divided in ♂, the second occasionally absent or vestigial ; underside of forewing without a median spot, or spot M^1—M^2 present, but minute. No white patch at anal angle of hindwing above. Foretarsus normal, first segment as long as 2 to 5 together, or a

little shorter, or the last segment vertically enlarged. ♂ often with a short yellowish discal band on the hindwing.

♂. Penis-sheath (Pl. LIV. f. 10. 11. 12) with the subapical patch of spines similar to that of *titan*, the patch consisting of two or three rows of spines, which are shorter than the diameter of the sheath proximally of the patch; length of whip different in the three subspecies. Tenth tergite (Pl. XLII. f. 8. 9) narrower at end than in *fadus* and *titan*. Harpe see Pl. XLVII. f. 1.

♀. Vaginal plate see Pl. XLI. f. 3.

Hab. Tropical and Subtropical America, found as a wanderer as far north as New York and Ohio.

a. S. tantalus zonata.

Sphinx zonata Drury, *Illustr. Ex. Ins.* i. p. 57. t. 26. f. 5 & *Index* (1773) (St. Christopher).
Sphinx terpunctata Goeze, *Ent. Beytr.* iii. 2. p. 216. n. 43 (1780) (St. Christopher).
Macroglossa tantalus, Walker, *List Lep. Ins. B. M.* viii. p. 88. n. 4 (1856) (partim ; Jamaica ; S. Domingo) ; Lucas, in Sagra, *Hist. Cuba* vii. p. 288 (1856) ; Herr.-Sch., *Corresp. Bl.* p. 56 (1865) (Cuba) ; Dew., *Mitth. Münch. Ent. Ver.* i. p. 91 (1877) (Porto Rico) ; Gundl., *Contr. Ent. Cub.* p. 174 (1881).
Aellopus tantalus, Grote, *Proc. Ent. Soc. Philad.* v. p. 42 (1865) (Cuba) ; id. & Rob., *ibid.* p. 150. n. 7 (1865); Butl., *Trans. Zool. Soc. Lond.* ix. p. 530. n. 1 (1877) (Jamaica ; Haiti ; St. Thomas); Kirby, *Cat. Lep. Het.* i. p. 634. n. 1 (1892) (partim ; Antilles).
Macroglossa zonata, Lucas, *l.c.*
Sphinx tripuncta (!), Butler, *l.c.* (sub synon.).

♂♀. Foretarsus normal, white spots of forewing more or less reduced in size or number.

♂. Process of penis-sheath (Pl. LIV. f. 12) about four times as long as the diameter of the sheath, with two separate tubercles before the end ; patch of spines little more extended than in *claripes*, widely separated from the apical spines.

Hab. West Indies ; Florida.

In the Tring Museum 6 ♂♂, 1 ♀ from : Jamaica, 20. v. '91, at blossom of wild cashaw at 8 or 9 a.m. (C. Taylor) ; Florida, viii. x.

b. S. tantalus tantalus.

Sphinx tantalus Linné, *l.c.* ; Cram., *l.c.* ; Fabr., *l.l.c.c.*
Sesia tantalus, Fabricius, *l.l.c.c.*
Sesia ixion, id., *l.l.c.c.*
Aellopus tantalus, Hübn., *Samml. Ex. Schm.* ii. t. 157 (1816-24) ; Bönningh., *Iris* xii. p. 135. n. 79 (1899) (partim ; Rio. de Jan.).
Macroglossa tantalus, Burmeister, *Sphing. Bras.* p. 73. n. 1 (1856) ; Walk., *List Lep. Ins. B. M.* viii. p. 28. n. 4 (1856) (partim) ; Clem., *Journ. Ac. Nat. Sc. Philad.* iv. p. 131. n. 6 (1857) (partim) ; Morris, *Cat. Lep. N. A.* p. 17 (1860) (partim) ; Clem., in Morris, *Syn. Lep. N. A.* p. 151. n. 2 (1862) (partim) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 358. n. 42 (1875) (partim) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 351 (1876) (Surinam).
Macroglossa sisyphus Burmeister, *Sphing. Bras.* p. 73. n. 2 (1856) (Rio de Jan.).
Aellopus sisyphus, Grote, *Proc. Ent. Soc. Philad.* v. p. 42 (1865) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 530. n. 4 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 635. n. 4 (1892) (Brazil) ; Kaye, *Trans. Ent. Soc. Lond.* p. 140 (1901) (Trinidad ; *haec spec. ?*).
Aellopus titan, Burmeister, *Descr. Rép. Argent.* v. p. 358 (1878) (partim).

♂♀. Burmeister's description of *sisyphus* applies to this form ; his specimen was discoloured. Foretarsus normal.

♂. Whip of penis-sheath (Pl. LIV. f. 10) about twice as long as the sheath is wide ; two tubercles at end ; patch of spines of sheath much more extended than in *zonata* and *claripes*.

♀. Vaginal plate (Pl. XLI. f. 3) similar to that of the other species, orifice free.

Hab. Argentina northward to Surinam and Veneznela.

In the Tring Museum 9 ♂♂, 5 ♀♀ from : Venezuela ; Amazons ; Matto Grosso ; Paragnay.

c. S. tantalus clavipes subsp. nov.

(?) *Aellopus tantalus*, Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 19 (1874) : id., *l.c.* ii. p. 224. n. 14 (1875) (Texas); id., *l.c.* iii. p. 221. n. 16 (1877) (Texas); Grey, *Canad. Ent.* xi. p. 140 (1879) (N. York, June) ; Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 1. n. 1 (1881) (partim) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 121 (1888) (= *titan* ex err.) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 281 (1895) (N. York ; distinct ?).

Oellopus (!) *tantalus*, Edwards, *Ent. Amer.* iii. p. 163 (1887) (pupa, Mexico).

♂♀. Generally somewhat larger than the two previous forms. The first protarsal segment longer than segments 2 to 5 together, and segments 3 to 5 strongly compressed and enlarged vertically, the tarsus appearing clubbed in side-view ; inner surface of the enlarged part more or less black. Disc of forewing sometimes with a minute dot in front of the double dot R^1—R^2.

♂. Penis-sheath (Pl. LIV. f. 11) with the patch of spines reduced in extent ; whip longer than in *tantalus tantalus*, with five or six tubercles distally ; three or four apical spines on right side of sheath.

Hab. Central America, and the Andes of South America as far south as Tucuman.

In the Tring Museum 4 ♂♂, 4 ♀♀ from : Guadalajara, Mexico, vii. (Schaus), *type* ; Tucuman.

372. **Sesia titan** (Pl. VIII. f. 16, ♀).

Sphinx titan Cramer, *Pap. Ex.* ii. p. 73. t. 142. f. F (1777).

Aellopus titan, Hübner, *Verz. bek. Schm.* p. 131. n. 1407 (1822) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 150. n. 8. (1865) (partim) ; Grote, *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (partim) ; id., *Bull. Buffalo Soc. N. Sc.* i. p. 19 (1874) (Ohio ; Texas ; partim) ; Thaxt., *Psyche* i. p. 29 (1874) (Mass. ; July) ; Grote, *l.c.* ii. p. 224. n. 13 (1875) (partim) ; id., *l.c.* iii. p. 221. n. 15 (1877) (partim) ; Burm., *Descr. Rép. Argent.* v. p. 358 (1878) (partim) ; Schaus, *Ent. News* vi. p. 141 (1895) (distinct from *tantalus*).

Macroglossa titan, Burmeister, *Sphing. Bras.* p. 73. n. 3 (1856) (partim) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 358. n. 43 (1875) (partim) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 351 (1876) (partim ; Surinam).

Macroglossa tantalus, Walker, *List Lep. Ins. B. M.* viii. p. 88. n. 4 (1856) (partim) ; Clem., *Journ. Ac. Nat. Sc. Philad.* iv. p. 131. n. 6 (1857) (partim) ; id., in Morris, *Syn. Lep. N. A.* p. 151. n. 2 (1862) (partim).

Aellopus fadus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 530. n. 2 (1877) (partim) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 119 (1888) (partim) : Kirby, *Cat. Lep. Het.* i. p. 634. n. 2 (1892) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 280. t. 3. f. 1 (1895) (N. York) ; Kirby, in Allen's *Nat. Libr., Moths* iv. p. 10 (1897) (partim).

Aellopus tantalus, Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 1. n. 1 (1881) (partim) ; id., *l.c. Suppl.* p. 298 (1896) ; Bönningh., *Iris* xii. p. 135. n. 79 (1899) (partim ; Rio de Jan.).

♂♀. Fabricius and Gmelin overlooked this species. Hübner was the first to include it again in the list of Sphingids. It comes close to *fadus* in colour, but cannot very well be confounded if one pays attention to the following points : discal spots of forewing always simple, never divided, white scaling at anal angle of hindwing more extended and denser ; foreleg of ♂ with two conspicuous black tufts, one at the end of the femur, the other near the apex of the tibia. The tibial tuft is mentioned by Burmeister in *Descr. Rép. Argent., l.c.*, but he considered it to be a character of the whole genus, while it is present only in *titan*.

♂. Penis-sheath (Pl. LIV. f. 9) much more similar to that of *tantalus* than to that of *fadus*; the spines at the left side of the sheath short, arranged in two or three rows; two or three apical spines, proximal ones about equal, distal one longer; whip shorter than in *fadus*.

Hab. Neotropical Region, extending occasionally into the Nearctic Region; not on the West Indies?.

In the Tring Museum 26 specimens from: Oaxaca, Mexico, vii. (Schaus); Costa Rica (Underwood); Bogota; Cauca R., Colombia; Salinas, Beni R., Bolivia, vii. (Stuart); Miranda, Matto Grosso, i. '99 (Stuart); Sapucay, near Villa Rica, Paraguay (Foster); Tucuman; Petropolis; Venezuela.

373. Sesia fadus.

Sphinx fadus Cramer, *Pap. Ex.* i. p. 95. t. 61. f. c (1775) (Surinam); Gmel., *Syst Nat.* i. 5. p. 2387. n. 96 (1790).

Sesia fadus, Fabricius, *Spec. Ins.* ii. p. 154. n. 5 (1781); id., *Mant. Ins.* ii. p. 99. n. 4 (1787); id., *Ent. Syst.* iii. 1. p. 379. n. 4 (1793).

Aellopus fadus, Hübner, *Verz. bek. Schm.* p. 131. n. 1408 (1822); Grote, *Proc. Ent. Soc. Philad.* v. p. 41 (1865) (distinct); Butl., *Trans. Zool. Soc. Lond.* ix. p. 530. n. 2 (1877) (partim); Maass., *Stett. Ent. Zeit.* xlix. p. 52 (1880) (= *tantalus* ex err.); Smith, *Trans. Amer. Ent. Soc.* xv. p. 119. t. 4. f. 5. 6. 7 (genit.) (1888) (partim); Kirby, *Cat. Lep. Het.* i. p. 634. n. 2 (1892) (partim); id., in Allen's *Nat. Libr., Moths* iv. p. 10 (1897) (partim).

Macroglossum annulosum Swainson, *Zool. Illustr.* iii. t. 132. f. 1 (1823) (Brazil).

Macroglossa balteata Kirtland, in Sillim., *Journ. Sc. Art* (2). xiii. p. 337. fig. (1852) (Ohio).

Macroglossa titan, Burmeister, *Sphing. Bras.* p. 73. n. 3 (1856) (partim; Colombia; Venez.; Guiana; N. Brazil); Lucas, in Sagra, *Hist. Cuba* vii. p. 288 (1856) (partim); Mén., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 95. n. 1579 (1857) (Haiti); Herr.-Sch., *Corresp. Bl.* p. 56 (1865) (Cuba); Boisd., *Spec. Gén. Lép. Hét.* i. p. 358. n. 43 (1875) (partim); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 351 (1876) (partim; Surinam); Gundl., *Contr. Ent. Cubana* p. 174 (1881) (*l.* on *Rubiaceae*); Bates, ed. Clodd, *Natur. Amaz.* p. 93. fig. (1892).

Macroglossa tantalus, Walker, *List Lep. Ins. B. M.* viii. p. 88. n. 4 (1856) (partim); Clem., *Journ. Ac. Nat. Sc. Philad.* iv. p. 131. n. 6 (1857) (partim); Morris, *Cat. Lep. N. A.* p. 17 (1860); Clem., in Morris, *Syn. Lep. N. A.* p. 151. n. 2 (1862) (partim).

Macroglossa fadus, Walker, *l.c.* viii. p. 89. n. 7 (1856); Boisd., *l.c.* p. 359. n. 44 (1875).

Aellopus titan, Grote, *Proc. Ent. Soc. Philad.* v. p. 41 (1865) (Cuba); id. & Rob., *ibid.* v. p. 150. n. 8 (1865) (partim); Grote, *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (partim); id., *Bull. Buffalo Soc. N. Sc.* i. p. 19 (1874) (Texas; partim); id., *l.c.* ii. p. 224. n. 13 (1875) (partim); id., *l.c.* iii. p. 221. n. 15 (1877) (partim); Burm., *Descr. Rép. Argent.* v. p. 358 (1878) (partim); Bönningh., *Iris* xii. p. 135. n. 78 (1899) (partim; Rio de Jan.).

Aellopus tantalus, Druce, *Biol. Centr. Amer., Lep. Het.* i. p. 1. n. 1 (1881) (partim); id., *l.c. Suppl.* p. 298 (1896) (partim; Mexico to Panama).

Cramer's figure was doubtless taken from a greasy specimen in which the white belt was not visible.

♂ ♀. Discal spots of forewing partly double, spots R^1—R^3 being always more or less completely divided into two lunules each, spot SC^5—R^1 always present; subtransparent median spots marked above and below. Foretibia and -tarsus normal.

♂. Penis-sheath (Pl. LIV. f. 8) with the whip long, bearing two or three tubercles before the tip; apical spines of sheath two or three in number, the most distal one the longest; spines at left side *long*, seven to nine in number, arranged in a *single* row.

Hab. Neotropical Region, inclusive of Cuba and Haiti; occasionally northward into the Nearctic Region.

In the Tring Museum 34 specimens from: Cuba; Guatemala; Peru; Bolivia; Paraguay; Matto Grosso; Espirito Santo; Surinam; British Guiana; Venezuela.

CIX. HAEMORRHAGIA.—Typus : *thysbe*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Sesia Fabricius, *Syst. Ent.* p. 547 (1775) (partim ; type : *tantalus*).
Macroglossum Scopoli, *Intr. Hist. Nat.* p. 414 (1777) (partim ; type : *stellatarum*).
Macroglossa Ochsenheimer, *Eur. Schm.* iv. p. 41 (1816) (partim).
Hemaris Dalman, *Kongl. Sr. Vet. Ak. Handl.* p. 207 (1816) (partim ; includes type of *Macroglossum*).
Cephonodes Hübner, *Verz. bek. Schm.* p. 131 (1822) (partim ; type : *hylas*).
Haemorrhagia Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 149 (1865) (*nom. nud.*) ; iid., *l.c.* p. 173 (1865) (type : *thysbe*).
Aege Felder, *Reise Novara, Lep.* t. 75 (1874) (*nom. indescr.*).
Chamaesesia Grote, *Bull. Buffalo Soc. N. Sc.* iii. p. 220 (1877) (type: *gracilis*).
Cochrania Tutt, *Brit. Lep.* iii. p. 503 (1902) (*nom. indescr.*).

Scopoli based his *Macroglossum* on "*stellatarum*, etc." This "etc." can only mean *fuciformis* and *tityus* (or one of them), since he separated *apiformis* and allies as *Aegeria*. Dalman described in 1816 *Hemaris* without taking any notice of *Macroglossum*, and included in his genus only *stellatarum*, *fuciformis*, and *tityus*. *Hemaris* is, therefore, an absolute synonym of *Macroglossum*.

♂♀. Genal process large, triangular. Eye strongly lashed. Antenna strongly clubbed in both sexes, hook thin, abrupt ; end-segment long, more or less cylindrical, with some bristles at end ; previous segment also cylindrical, short, or obliquely produced ventrad with the sense-cone prominent (*rubra*). Spines of abdomen flat, very strong, proximal ones shorter than long (except on proximal sternites), rounded ; sternite of seventh segment of ♀ *with* spines at end ; fan-tail large, expansible. Foretibia with a few spines at apical edge, generally concealed by the scales ; spur of foretibia long, only a little short of tip of tibia ; merum of midcoxa produced into a sharp process, hindmerum also with process, but this obtuse ; spines of comb of midtarsus not obviously prolonged ; spurs very unequal, long terminal one longer than second tarsal segment ; first segment of hindtarsus shorter than tibia ; pulvillus well developed or absent, with intergradations ; ventral pair of paronychial lobes present, or vestigial, or absent. Distal edges of wings entire ; forewing with transparent spaces, or at least with a sharply defined marginal band. SC^2 and R^1 of hindwing from a point or shortly stalked, R^2 central or a little before centre, cross-veins transverse, slightly curved, R^3 and M^1 always separate.

♂. Tenth tergite divided, slightly asymmetrical (Pl. XLIII. f. 19—26), sometimes the asymmetry more obvious (*renata*, Pl. XLIII. f. 19) ; sternite either with two long processes, or the right process aborted, the remaining left process more or less asymmetrical (Pl. XLIII. f. 20. 22. 23). Claspers unequal (Pl. LI. f. 17—21 ; LII. f. 4. 5), elongate ; no friction-scales ; left harpe (*l,II*) always vestigial ; right harpe (*r,II*) sometimes vestigial, but mostly produced into a more or less club-shaped process. Penis-funnel large, obliquely truncate, or ventrally prolonged ; penis-sheath mostly very slender, ending in a pointed or flattened process, which is dentate at end in one instance (*gracilis*), seldom (*renata*) heavy and armed with a dentate projection (Pl. LII. f. 5).

♀. Eighth tergite transverse, truncate-rounded, rather strongly chitinised also in middle ; vaginal plate small, proximally membranaceous, vaginal orifice on the left side ; membrane connecting seventh and eighth segments (resp. seventh segment and vaginal plate) rather long, there being a cavity all round between the two segments, allowing the tail a free movement.

Larva slightly tapering in front, with pale dots all over bearing short setae ;

granules of pronotum conspicuous ; horn also strongly granulose ; a pale dorso-lateral line from head to horn, an inconspicuous line at each side of dorsal mesial line.—Food-plants : *Rubiaceae : Lonicera ; Viburnum ; Prunus ; Scabiosa :* etc.

Pupa without gloss, nearly black, rough ; two small frontal tubercles ; tongue-case not carinate ; cremaster flattened, triangular, rough, ending in two points, sides rough with setiferous tubercles.

Hab. Nearctic, Palaearctic, and Oriental Region, most species in the Palaearctic Region.

Grote has recognised from the beginning of his studies in Lepidopterology that the species of *Haemorrhagia* (=*Hemaris* auct.) are generically distinct from *Macroglossum stellatarum* and allies. We emphasise this fact, as most Palaearctic writers—from the time of Scopoli, who invented the term *Macroglossum* for "*stellatarum*, etc.," and Dalman, who erected his genus *Hemaris* for *stellatarum*, *fuciformis*, and *tityus*, down to the Catalogue of Staudinger & Rebel—did not recognise the wide difference between the two groups of species.

Haemorrhagia is a northern development extending with two of its species into the Oriental Region, being entirely absent from the Aethiopian and Neotropical Regions.

The species, so far as a series of specimens is known of them, are nearly all obviously variable. The variation refers to size and colour, and to the dentition of the marginal bands. Very fortunately, it has been proved by breeding that two of the American species are variable seasonally and individually, so that the reader is amply prepared for seeing the number of so-called species greatly reduced in this Revision. Instead of the twenty American species of Kirby's Catalogue we recognise as distinct only four, one of which consists of three subspecies, and there are only eleven Old World species.

Though there is strongly marked seasonal dimorphism in several species, the differences do not appear in all individuals of the same brood. The most extreme summer forms do not seem to occur in springtime (*thysbe* f. loc. *fuscicaudis*, *diffinis* f. aest. *axillaris*), while specimens of the character of the spring form appear among the summer brood. Further observations are a desideratum, especially in Amurland and Japan, where the individuals with heavily dentate wing-borders will probably turn out to belong to the summer broods.

It is worthy of note that the American "species" were separated by Grote into three subgenera, which correspond to three species of this Revision. The fourth species was not known to Grote.

In the recently published Catalogue of Palaearctic Lepidoptera by Staudinger & Rebel, Staudinger erroneously put *croatica* under *Macroglossum*, where it does not belong. His *scabiosae* var. *brunneobasalis* is the same as *mandarina*, a form of *radians* ; *tenuis* put with ? under *scabiosae* has nothing to do with it ; *marginalis* treated as a synonym of "var." *confinis* is, like *tenuis*, a form of *diffinis* ; *affinis* is, as correctly suggested, the Pacific representative of *fuciformis* ; var. *robusta* is not a "var.," *i.e.* geographical form.

The asymmetrical development of the male sexual armature is not so pronounced as in some species of *Cephonodes* (see this), but mostly very obvious. We find the tenth tergite divided in two processes in all the species, the left (right in figures) process never aborting, as is the case in some species of *Cephonodes*. The tenth sternite is nearly symmetrical in *fuciformis* and *tityus* (Pl. XLIII. f. 22), and curved towards the left side in the other species (Pl. XLIII. f. 23—26). From

this it would appear that the sternite of *fuciformis* had preserved the more ancestral shape, and that the asymmetrical one was the younger development. We think just the reverse is the case. For in *H. renata*, as in *Cephonodes janus*, we find the tenth sternite divided into two processes, curving laterad at tip in *renata*, as in *Sesia*, etc. This *renata* sternite, representing the essential features of the divided sternite of the allied genera from *Sesia* down to *Madoryx* and *Pachylia*, is a more ancestral type than the apparently simple sternite of the other *Haemorrhagia*. As *renata* agrees structurally with *fuciformis*, etc., except in the tenth abdominal segment and the penis-sheath, there must be a connection between the divided and the simple sternite. We have shown under *Cephonodes* that the apparently simple tenth tergite of *hylas*, etc., is the result of the reduction of the left lobe, which remains vestigial at the base of the long right lobe. On looking over the great number of dissections of *Haemorrhagia*, we find that there is in many cases, at the base of the ventral process on the right side, a piece of chitin separated from the process by the vestige of a groove (Pl. XLIII. f. 25, *r*) ; this piece is doubtless the rest of the right process of the sternite. We regard, therefore, the single asymmetrical process of *thysbe*, *staudingeri*, etc., homologous with the asymmetrical left process of the divided sternite of *renata*, and think that the nearly symmetrical process of *fuciformis* is a derivation from an asymmetrical one.

The difference between the right and left clasper is obvious in all species, but more marked in some than in others (Pl. LI. f. 17—21 ; LII. f. 4. 5). The claspers are most similar in *diffinis* (Pl. LI. f. 21). The left harpe (*H.l*) is always smaller than the right one ; it has never a prominent process, while the right harpe is in many species produced into a more or less clubbed process, generally armed at the end with spines or clothed with long bristles. We repeat, it is the left harpe which is the more reduced, while it is the right process of the tenth sternite and the left process of the tenth tergite which is obliterated in most *Haemorrhagia* and some *Cephonodes*. This is remarkable, for it is not difficult to perceive that it should have been the left process of the tenth sternite which disappeared, instead of the right one, if the obliteration of the left process of the tenth tergite and of the left harpe of the ninth segment was due only to an inherent tendency in these segments to become reduced on the left side. As in the case of the tenth segment it is the left side of the dorsal plate and the right side of the ventral plate which atrophy, it is clear that there must be some other reason for this peculiar development.

Comparing the most primitive tenth segment, as preserved in *H. renata*, with the most specialised one, as found in *Cephonodes leucogaster*, we see that at the highest degree of specialisation attained, the double forceps, which moves vertically, is replaced by a single forceps moving horizontally (Pl. XLIII. f. 9. 10). At first sight it appears to be great waste to drop the right ventral process and to move the left one towards the right side and upwards, instead of dropping the left one and bringing the nearer right one in the position in which the sternal process is situated in *leucogaster*. But the species of *Haemorrhagia* and several *Cephonodes* show that the right ventral process is lost without the movement of the left one towards the right side having begun. Therefore it is obvious that the absence of the process is not dependent on the twisting of the segment to form a horizontal forceps, and that the complete twisting of the segment, as observed in *C. leucogaster*, took place probably after the loss of the right ventral process.

Besides the reduction of the bifurcate sternite to one with a single process, we observe another line of development, illustrated by *Cephonodes janus* and *hylas*.

The processes of *janus* are already both reduced ; they are fluctuating, and the continuation of this development will doubtless result in a sternite without processes, as found in *C. hylas*.

Key to the species :

a. Underside of thorax and abdomen, legs and apex of tail orange-ochraceous	374.	*H. venata*.
Underside not orange-ochraceous		*b*.
b. Hindwing ferruginous or cinnamon-rufous, without vitreous spaces		*c*.
Hindwing ferruginous with vitreous spaces ; no pulvillus	388.	*H. ducalis*.
Hindwing ferruginous, basal area green ; vitreous spaces ; pulvillus present	387.	*H. dentata*.
Border of hindwing reddish chocolate, or black, or grey		*d*.
c. Forewing with sharply marked reddish hazel border, without vitreous spaces.	385.	*H. croatica*.
Forewing unicolorous, with more or less distinct vitreous spaces	386.	*H. rubra*.
d. Distal border of forewing dilated at R^2 (apart from dentition)	375.	*H. thysbe*.
Distal border of forewing not dilated at R^2, breast with reddish tawny lateral stripe	376.	*H. gracilis*.
Distal border of forewing not dilated at R^2, breast without reddish tawny lateral stripe		*e*.
e. Base of wings below broadly orange-ochraceous, distal border below olive-brown, not chestnut red		*f*
Base of wings below not orange-ochraceous, distal border often chestnut-red		*g*.
f. Basal area of hindwing above bright orange-ochraceous ; distal border of forewing dentate, or as broad between M^1 and M^2 as this cellule is wide	380.	*H. radians*.
Basal area of hindwing paler, distal border not dentate, narrower	379.	*H. tityus*.
g. Cell of forewing with scaled fold		*h*.
Cell of forewing without scaled fold		*i*.
h. Bar upon cross-veins of forewing heavy, or border of hindwing thinner than the cellules are wide at end, or underside of abdomen all grey	381.	*H. fuciformis*.
Bar upon cross-veins not heavy, border of hindwing at least as broad as the cellules are wide, underside of abdomen not all grey	382.	*H. beresowskii*.

i.	American species	*j.*
	Palaearctic and Oriental species . . .	*k.*
j.	Underside of abdomen entirely, and legs almost entirely, grey	378. *H. brucei.*
	Underside of abdomen more or less black	377. *H. diffinis.*
k.	Belt of abdomen more or less chestnut-red, border of wings not dentate, that of hindwing very thin . . .	384. *H. saundersi.*
	Belt of abdomen black, or border of forewing dentate	*l.*
l.	Border of wings below wood-brown or clay-colour, no vitreous streak in abdominal area	379*a*. *H. tityus alaiana.*
	Border of wings below chocolate or chestnut-brown, a vitreous streak in abdominal area	*m.*
m.	Border of hindwing as broad as the cellules are wide	382. *H. beresowskii.*
	Border of hindwing narrower than the cellules are wide	383. *H. staudingeri.*

374. Haemorrhagia venata.

**Macroglossa venata* Felder, *Sitz. Ber. K. K. Ak. Wiss. Wien* xliii. p. 29. n. 61 (1861) (Amboina ;— Mus. Tring) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 373. n. 64 (1875) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 109. n. 214 (1888) (Amboina).

Aega venata Felder, *Reise Novara, Lep.* t. 75. f. 6 (♂) (1874) (Amboina).

Hemaris venata, Butler, *Trans. Zool. Soc. Lond.* ix. p. 520. n. 13 (1877).

Cephonodes venata, Kirby, *Cat. Lep. Het.* i. p. 627. n. 4 (1892).

♂. Upperside of body not well preserved ; unicolorous ? Tip of tail, especially below, breast, legs, and underside of abdomen yellow, palpi more white beneath. Antenna slender, hook long (tip of both antennae broken). Generically distinct ?

Sexual armature very peculiar, resembling in some respects that of *Cephonodes janus*. Tenth tergite divided into two divergent and obtuse processes (Pl. XLIII. f. 19), which are not quite identical in shape ; ninth tergite strongly asymmetrical, tenth less so, but obviously twisted, so that the right lobe of the sternite is visible in a dorsal aspect : tenth sternite (Pl. XLIII. f. 20) almost completely separated into two long lobes, of which the left is slightly longer than the right, both curved laterad at end, the sternite reminding one of that of *Cephonodes janus*. Claspers (Pl. LII. f. 5) broad, especially the left one (*l*) ; harpe with a tiny tooth representing the process. Penis-funnel truncate ; penis-sheath stout, very different from that of the other species, ending in a compressed, stout process, which is dentate at the edge.

♀ and early stages not known.

Hab. Amboina.

Only the *type* known to us (in the Tring Museum, ex coll. Felder).

375. Haemorrhagia thysbe.

Sesia thysbe Fabricius, *Syst. Ent.* p. 548. n. 4 (1775) (America).

Hemaris thysbe, Fernald, *Sphing. N. Engld.* p. 16. n. 4 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 98. t. 4. f. 1 (genit.) (1888).

♂ ♀. Palpus longer than in the other species, hook of antenna also rather longer. Abdomen and wings beneath chestnut-red to cinnamon-rufous. Legs yellowish white, like breast, except upperside of foreleg, hindtarsus, tip of hindtibia, and part of midtarsus. Cell of forewing either entirely sealed, or the vitreous space divided by a sealed fold, distal border dilated at R^2, dentate or simple; hindwing sealed beyond end of cell.

♂. Tenth tergite truncate, tip of each process sinuate, essentially as in *fuciformis*; sternite (Pl. XLIII. f. 25) asymmetrical as in *gracilis*, the vestige of the right lobe (*r*) rather more obvious than in other species. Left clasper (Pl. LI. f. 17, *l*) very slender, somewhat spatulate, rounded dilated ventrally near base, process of harpe (*H*) represented by a short projection accompanied by a broader and lower hump which bears some bristles; right clasper (*r*) also slender, shallowly emarginate ventrally beyond middle, harpe ending in a club-shaped process which bears long spines on the upperside at apex. Penis-funnel (P-F) smooth, not granulose; penis-sheath (P) ending in a long, but not sharply pointed, process.

Larva green, with a rather sharply defined reddish ventral band, which is often restricted to the last segments, dorsal mesial line accompanied at each side by a white line; a yellowish dorso-lateral line ending at horn.—Food-plants: *Viburnum*; *Symphoricarpus*; *Prunus*; *Crataegus*; etc.

A variable species. We distinguish three principal forms, which are connected by all intergradations.

a'. H. thysbe f. loc. *fuscicaudis.*

**Sesia fuscicaudis* Walker, *List Lep. Ins. B. M.* viii. p. 83. n. 6 (1856) (Georgia;—Mus. Brit.); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 130. n. 3 (1859); Morris, *Cat. Lep. N. Am.* p. 17 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 150. n. 3 (1862).

Haemorrhagia fuscicaudis, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 150. n. 6 (1865); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 7. 8. 19 (1874); id., *l.c.* ii. p. 224. n. 12 (1875); id., *l.c.* iii. p. 220. n. 14 (1877).

Macroglossa fuscicaudis, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 373. n. 63 (1875).

Hemaris fuscicaudis, Butler, *Trans. Zool. Soc. Lond.* ix. p. 522. n. 23 (1877); Streck., *Lep. Rhop. Het.* p. 140 (1877) (= southern form of *thysbe*); Maass., *Stett. Ent. Zeit.* xli. p. 51 (1880) (= *thysbe*); Grote, *Canad. Ent.* xviii. p. 130. n. 14 (1886) (Georgia); Smith, *Trans. Amer. Ent. Soc.* xv. p. 106 (1888) (= *thysbe* ?); Kirby, *Cat. Lep. Het.* i. p. 624. n. 1 (1892).

♂ ♀. Fourth to last segment of abdomen, above, chestnut-red, sometimes almost black, in specimens leading over to the next with tawny-olive lateral patches on segments 6 and 7; border of forewing dentate.

A southern form which does not extend northward to N. England; it is the usual summer form in the Southern States.

b'. H. thysbe f. *thysbe.*

Sesia thysbe Fabricius, *Syst. Ent.* p. 548. n. 4 (1775) (America); id., *Spec. Ins.* ii. p. 155. n. 10 (1781); id., *Mant. Ins.* ii. p. 99. n. 10 (1787); id., *Ent. Syst.* iii. 1. p. 381. n. 10 (1793); Walk., *List Lep. Ins. B. M.* viii. p. 82. n. 5 (1856); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 129. n. 2 (1859) (partim); id., in Morris, *Syn. Lep. N. Am.* p. 149. n. 2 (1862) (partim); Lintner, *Proc. Ent. Soc. Philad.* iii. p. 646 (1864) (life hist.); id., *Ent. Contr.* i. p. 190 (1872) (N. York, E. v.); Caulf., *Canad. Ent.* vii. p. 241. n. 1 (1875) (Montreal, vi.).

Sphinx pelasgus Cramer, *Pap. Exot.* iii. p. 93. t. 248. f. B (1779) (N. York; "Jamaica" err. loci !).

Sphinx thysbe, Goeze, *Ent. Beytr.* iii. 2. p. 208. n. 19 (1780); Gmel., *Syst. Nat.* i. 5. p. 2388. n. 100 (1790).

Cephonodes pelasgus, Hübner, *Verz. bek. Schm.* p. 131. n. 1405 (1822).

Sesia pelasgus, Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 308. n. 1 (1839); Morris, *Cat. Lep. N. Am.* p. 17 (1860); Harris, ed. Flint, *Ins. Inj. Veg.* p. 328. f. 156 (1863); Morris, *ibid.* (1863) (= *thysbe*).

Sesia ruficaudis Kirby, *Fauna Bor. Am.* iv. p. 303 (1837); Walk., *List Lep. Ins. B. M.* viii. p. 82. n. 4 (1856) (var. of *thysbe?*); Morris, *Cat. Lep. N. Am.* p. 17 (1860); Coup., *Canad. Ent.* iv. p. 205 (1872); Beth., *ibid.* xi. p. 152 (1879).

Macroglossum pelasgus, Blanchard, in Orb., *Dict. Hist. Nat.* xi. p. 755. *Atlas Lép.* t. 16. f. 1 (1849).

Macroglossa pelasgus, Lucas, in Sagra, *Hist. Cuba* vii. p. 290 (1856) ("Cuba, Jamaica," *err. loci!*); Mén., *Eu. Corp. Anim. Mus. Petr. Lep.* ii. p. 95. n. 1587 (1857).

Haemorrhagia ruficaudis, Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 149. n. 4 (1865); iid., *l.c.* p. 175 (1865).

Haemorrhagia thysbe, iid., *l.c.* v. p. 149. n. 5 (1865); Grote, *ibid.* vi. p. 328 (1867) (Cuba?); Beth., *Canad. Ent.* i. p. 10. n. 9 (1869); Bowl., *ibid.* iii. p. 143 (1871) (Quebec); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 7. 19 (1874); id., *l.c.* ii. p. 224. n. 11 (1875); id., *l.c.* iii. p. 220. n. 13 (1877) (partim); id., *Canad. Ent.* xviii. p. 130. n. 13 (1886); id., *Hawk Moths N. Am.* p. 27 (1886).

Macroglossa thysbe, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 369. n. 58 (1875) (partim; "Jamaica" *err. loci*); Hulst, *Bull. Brookl. Ent. Soc.* ii. p. 38 (1880); Pilate, *Papilio* ii p. 67 (1882) (Dayton, O., rare).

Macroglossa etolus Boisduval, *l.c.* p. 370. n. 59 (1875); Smith, *l.c.* p. 102 (1888) (= *thysbe*).

Macroglossa ruficaudis, Boisduval, *l.c.* p. 371. n. 61 (1875).

Hemaris thysbe, Thaxter, *Psyche* i. p. 29 (1874) (Newton, Mass.; vi.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 521. n. 18 (1877); Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine); Edw., *Bull. U. St. N. Mus* xxxv. p. 38 (1889) (liter. rel. to metam.); Kirby, *Cat. Lep. Het.* i. p. 624. n. 3 (1892); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 227. t. 2. f. 1 (1895); Cross, *Ent. News* vii. p. 297 (1896) (N. Hampshire); Harv. & Knight, *Psyche* viii. p. 78 (1897) (Maine); Rowl., *Ent. News* ix. p. 191 (1898) (Missouri); id., *l.c.* x. p. 12 (1899) (Missouri. two broods); Heath, *Canad. Ent.* xxxiii. p. 99 (1901) (Manitoba).

Hemaris ruficaudis, Butler, *Trans. Zool. Soc. Lond.* ix. p. 521. n. 19 (1877); Streck., *Lep. Rhop. Het.* p. 140 (1877) (partim); Maass., *Stett. Ent. Zeit.* xli. p. 51 (1880) (= *thysbe*); Smith, *Trans. Amer. Ent. Soc.* xv. p. 103. 106 (1888) (= *thysbe?*); Kirby, *Cat. Lep. Het.* i. p. 624. n. 4 (1892); Hanh., *Canad. Ent.* xxxi. p. 49 (1899) (Manitoba).

Hemaris etolus, Butler, *l.c.* ix. p. 634 (1877); Maass., *l.c.* xli. p. 69 (1880) (= southern form of *thysbe*); Edw., *Ent. Amer.* iii. p. 223 (1888).

Hemaris thisbe (!), Soule, *Psyche* viii. p. 155 (1897) (larva nearly all red).

Hemaris thysbe Fabr. var. *ruficaudis*, Hanham, *Canad. Ent.* xxix. p. 292 (1897) (Manitoba).

♂♀. Sixth and seventh abdominal tergite tawny-olive, sixth mostly with red-brown mesial spot; border of forewing more or less dentate. In a specimen from Michigan in coll. Oberthür there is no transparent space on the hindwing, and the vitreous area of the forewing is much reduced (Pl. IX. f. 14).

c'. H. thysbe f. *cimbiciformis.*

Sesia cimbiciformis Stephens, *Illustr. Brit. Ent., Haust.* i. p. 135. n. 3 (1828).

Sesia thysbe, Wood, *Ind. Ent.* p. 247. t. 53. f. 29 (1854).

Sesia ruficaudis, Walker, *l.c.* viii. p. 82. n. 4 (1856) (partim).

Haemorrhagia floridensis Grote & Robinson, *Ann. Lyc. N. York* viii. p. 439. t. 16. f. 20 (♂) (1867) (Florida, Febr.); Grote, *Bull. Buffalo S. N. Sc.* i. p. 18 (1874); id., *l.c.* ii. p. 224. n. 10 (1875); id., *l.c.* iii. p. 220. n. 12 (1877); Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 59 (1892) (cotype, Florida).

Sesia thysbe uniformis Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 181 (1868) (= *ruficaudis* Walker, *non* Kirby).

Haemorrhagia uniformis, Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 18 (1874); id., *l.c.* ii. p. 224. n. 9 (1875); id., *l.c.* iii. p. 220. n. 11 (1877) (Anticosti; Canada; N. York; Penn.); id., *Canad. Ent.* ix. p. 131 (1877) (dist. from *ruficaudis*); id., *l.c.* xviii. p. 190 (1886) (probably dist. from *thysbe*).

**Haemorrhagia buffaloensis* Grote & Robinson, *Ann. Lyc. N. York* viii. p. 439. t. 16. f. 18 (♂) 19. (♀) (1867) (Buffalo;—Mus. Brit.); Grote, *Bull. Buffalo S. N. Sc.* i. p. 18 (1874); id., *l.c.* ii p. 224. n. 8 (1875); id., *l.c.* iii. p. 220. n. 10 (1877); id., *Hawk Moths N. Am.* p. 27 (1886); id., *Canad. Ent.* ix. p. 131 (1877) (dist. from *uniformis*); id., *l.c.* xiii. p. 175 (1881) (distinct); Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 60 (1892) (cotype, N. York).

Sesia buffaloensis, Lintner, *Ent. Contr.* ii. p. 112 (1873).
Sesia uniformis, id., *l.c.* p. 172 (1873) ; Caulf., *Canad. Ent.* vii. p. 241. n. 2 (1875) (Montreal, vi.).
Macroglossa pyramus Boisduval, *Spec. Gén. Lép. Hét.* i. p. 372. n. 62 (1875).
Macroglossa ruficaudis, Strecker. *Lep. Rhop. Het.* p. 109. t. 13. f. 1 (♂) (1876) (syn. partim).
Hemaris buffaloensis, Butler, *l.c.* ix. p. 522. n. 20 (1877) ; Edw., *Papilio* iii. p. 25 (1883) (N. Jersey) ; Kirby, *Cat. Lep. Het.* i. p. 625. n. 5 (1892) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 104 (1888) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 38 (1889) (liter. rel. to metam.) ; Beutenm., *l.c.* x. p. 310 (1898) (N. York).
Hemaris floridensis, Butler, *l.c.* ix. p. 522. n. 22 (1877) ; Edw., *Papilio* iii. p. 25 (1883) (N. Jersey) ; Kirby, *Cat. Lep. Het.* i. p. 624. n. 2 (1892).
Hemaris pyramus, Butler, *l.c.* ix. p. 634 (1877) ; Edw., *Ent. Amer.* iii. p. 223 (1888) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 103 (1888) (= *uniformis*) ; Kirby, *Cat. Lep. Het.* i. p. 625. n. 7 (1892).
Hemaris uniformis, Edwards & Ell., *Papilio* iii. p. 125 (1883) (larva, on *Viburnum*) ; Kirby, *Cat. Lep. Het.* i. p. 625. n. 6 (1892).
Hemaris thysbe var. *uniformis*, Holland, *Canad. Ent.* xviii. p. 101 (1886) (Pittsburgh) ; Beutenm , *Bull. Amer. Mus. N. H.* iv. p. 60 (1892) (cotype) ; id., *l.c.* vii. p. 277. t. 2. f. 2 (1895) ; Kunze, *Ent. News* vii. p. 9 (1896) (Westchester, N.Y. ; Manitoba) ; id., *l.c.* p. 86 (1896) (the same note as before !).
Hemaris thysbe dim. var. *uniformis* Grote, *Canad. Ent.* xviii. p. 130. sub n. 13 (1886).
Hemaris thysbe (?) var. min. *buffaloensis* id., *l.c.* (1886).
Hemaris thysbe (?) var. maj. *floridensis* id., *l.c.* (1886).
Hemaris thysbe var. *floridensis*, Beutenmüller, *l.c.* vii. p. 277 (1895).

♂ ♀. Variable in size like f. *thysbe*, but more so. Sixth and seventh abdominal tergite tawny-olive, with or without red-brown mesial spot ; border of forewing not dentate.

This is the ordinary spring form, but occurs also in the summer. Some of our Florida specimens are smaller than some of our New England ones.

Hab. Atlantic district of Nearctic Region : Canada to Florida and Texas, westward to the Mississippi basin.

In the Tring Museum 4 larvae, 1 pupa ; and :—

f. loc. *fuscicaudis*, 14 ♂♂, 5 ♀♀ from : Sanford, Florida, vi. ; Raleigh, N.C., viii. (Brimley).

f. *thysbe*, 17 ♂♂, 9 ♀♀ from : Hastings, Florida, vi. ; Long I., vi. ; N. Jersey, vii. ; Massachusetts ; Illinois ; Iowa.

f. *cimbiciformis*, 4 ♂♂, 10 ♀♀ from : Hastings, Florida, vi. ; Texas ; Quincy, Illinois, iv. v. ; Babylon, Long I., 3. vi. 1902 (N. C. Rothschild) ; Maine.

376. Haemorrhagia gracilis.

Sesia ruficaudis, Walker (*non* Kirby, 1837), *List Lep. Ins. B. M.* viii. p. 82. n. 4 (1856) (partim ; N. York).
Haemorrhagia gracilis Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 149. 174. t. f. 1. 2 (♂) (1865) (Canada West) ; iid., *l.c.* p. 149. n. 3 (1865) ; Bowl., *Canad. Ent.* iii. p. 143 (1871) (Quebec) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 7. 8. 18 (1874) (Canada ; N. York) ; id., *l.c.* ii. p. 224. n. 7 (1875) (N. York ; Mass.) ; Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 59 (1892) (cotype, Canada).
Sesia gracilis, Bethune, *Canad. Ent.* i. p. 10 (1869) ; Lintn., *Ent. Contr.* i. p. 190 (1872) (N. York, beg vi.) ; id., *l.c.* iii. p. 179 (1872).
Hemaris gracilis, Thaxter, *Psyche* i. p. 29 (1874) (Newton, Mass., E. V.—M. vi. ; M. vii.—E. viii.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 522. n. 21 (1877) (N. York) ; Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine) ; id., *Sphing. N. Engl.* p 16. n. 3 (1886) (Maine, vi.) ; Grote, *Canad. Ent.* xviii. p. 130. n. 12 (1888) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 97 (1888) (Canada ; Maine ; Mass. ; N. York ; Eastern and Middle States) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 278. t. 2. f. 3 (1895) (N. York, very rare, v. & vi., vii. & viii.).
Macroglossa gracilis, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 371. n. 60 (1875).
Chamaesesia gracilis, Grote, *Bull. Buffalo Soc. N. Sc.* iii. p. 220. n. 9 (1877) (N. York ; Mass.) ; id., *Hawk Moths N. Am.* p. 26 (1886).

♂♀. Breast on each side with a reddish tawny horizontal stripe, not found in any other species ; abdomen below cinnamon-rufous, with creamy mesial spots, largest on proximal segments ; legs the same colour as abdomen. A small vitreous space in apex of cell of forewing, not divided. Vitreous area of hindwing below followed behind by a creamy patch.

♂. Tenth tergite shaped as in *fuciformis*, but sinnate beneath before apex, not at tip ; sternite of the same type as in *staudingeri*, but narrower. Left clasper (Pl. LI. f. 18, *l*) deeply sinnate ventrally, the proximal part not so much projecting as in *fuciformis*, also broader than in *thysbe*, the apical lobe less slender than in *thysbe*, harpe not projecting, gradually narrowed, with a few hairs ; right clasper (*r*) broader than in *thysbe*, feebly emarginate ventrally beyond middle, harpe (*H*) without free process, gradually narrowed to a point. Penis-funnel (P-F) carinate beneath, ending in a slender and smooth point ; penis-sheath differing from that of all the other species in the apical process being truncate and, at the apical edge, dentate (Pl. LI. f. 18, *P*).

Early stages not known.

Hab. Atlantic district : Canada ; New England ; rare, and therefore probably overlooked in the more southern States.

In the Tring Museum 1 ♂, 1 ♀ from N. York.

377. **Haemorrhagia diffinis.**

Sphinx fuciformis Abbot & Smith (*non* Linné, 1758), *Ins. Georgia* i. p. 86. t. 43 (1797).
**Macroglossa diffinis* Boisduval, *Spec. Gén. Lép.* i. t. 15. f. 2 (1836) (coll. Charles Oberthür).
Sphinx fusiformis (!), Kirby, *Cat. Lep. Het* i. p. 626. sub n. 21 (1892).

♂♀. Vitreous area of cell of forewing not divided by a scaled fold. Body more shaggy than in *gracilis* and *thysbe*, but less than in *tityus*. Legs more or less extended black ; long spurs comparatively shorter than in *tityus*. Very variable individually, seasonably, and geographically.

♂. Tenth segment essentially as in *thysbe*, sternite always asymmetrical, often emarginate at the right sight, the vestige of the right lobe of *venata* then being a little more distinct than usually. Claspers (Pl. LI. f. 21) not very unlike, often nearly the same, the right one generally slenderer ; left harpe ending in a short process, bearing some hairs ; proximally of the process there is a curved, somewhat halfmoon-shaped hump densely beset with minute spines ; right harpe similar, but the process longer, often clubbed, with long hairs at the end. Penis-funnel (P-F) truncate, smooth ; process of penis-sheath simple, pointed.

Larva similar to that of *thysbe* ; dorsally shaded with brown, mesial line accompanied at each side by a darker (not paler) line.—Food-plants : *Symphoricarpus*, *Lonicera*, *Apocynum*, etc.

Hab. Nearctic Region from the Atlantic to the Pacific.

The various forms of this insect have been described as 13 distinct species. Since Hulst proved by breeding that the forms of *thysbe* with dentate and non-dentate wing-borders were the same species, the belief in the distinctness of the allies of *diffinis* has become shaky. Smyth, in 1900, succeeded in rearing several broods of *diffinis*, and found that the differences assumed to be specific by the older writers are in fact only seasonal or individual. On comparison of the individuals of our long series from various parts of the Nearctic Region we find that there is no structural difference between all these "species" in question, but that there are well-marked geographical races each variable in itself. These races are : (1) the

Atlantic race, extending in Canada westwards to the Pacific ; (2) the central race, inhabiting the eastern side of the Rockies from New Mexico to Montana ; and (3) the Pacific race, occupying the country between the Rocky Mountains and the Pacific Ocean.

We keep *brucei* distinct for reasons given under that heading.

a. H. diffinis diffinis.

Sphinx fuciformis. Abbot & Smith, *l.c.* (partim ; imago).
**Macroglossa diffinis* Boisduval, *l.c.*
Hemaris diffinis, Fernald, *Sphing. N. Engl.* p. 14 (1886) ; Smyth, *Ent. News* xi. p. 584 (1900) (*diffinis* bred from *axillaris*, and the reverse).

♂ ♀. Legs for the greater part black ; middle of tail of the same colour as the two previous segments and thorax ; underside of abdomen black ; base of wings black above and below, with little pale scaling.

Three principal forms, connected by intergradations :—

a'. H. diffinis diffinis f. vern. *tenuis.*

**Hemaris tenuis* Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 4. 18. t. 1. f. 6 (1874) (N. York ; Penn. ;—Mus. Brit.) ; id., *l.c.* ii. p. 224. n. 3 (1875) ; id., *l.c.* iii. p. 220. n. 5 (1877) (N. York ; Ohio ; Wisc.) ; id., *Psyche* ii. p. 66 (1877) ; Coq., *Trans. Dept. Agr. Illin., App.* p. 160 (1880) ; Fish., *Canad. Ent.* xv. p. 238 (1883) (Buffalo ; larva) ; id., *l.c.* xvi. p. 143 (1884) ; Fern., *Sphing. N. Engl.* p. 14. n. 1 (1886) ; Holl., *Canad. Ent.* xviii. p. 101 (1886) (Pittsburgh ; larva on *Symph. racem.*) ; Grote, *ibid.* xviii. p. 130. n. 7 (1886) ; id., *Hawk Moths N. Am.* p. 26 (1886) ; id., *Canad. Ent.* xix. p. 19. 79 (1887) ; Smith, *l.c.* xv. p. 93 (1888) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 37 (1889) (liter. rel. to metam.) ; Kirby, *Cat. Lep. Het.* i. p. 626 n. 24 (1892) ; Hanb., *Canad. Ent.* xxix. p. 292 (1897) (Manitoba) ; Smyth, *Ent. News* xi. p. 584 (1900) (spring form of *diffinis*) ; Heath, *Canad. Ent.* xxxiii. p. 99 (1901) (Manitoba).
Macroglossa fumosa Strecker, *Lep. Rhop. Het.* p. 93 (1874) ; Grote, *Canad. Ent.* vi. p. 199 (1874) (fresh specim.) ; Streck., *l.c.* t. 13. f. 3 (1876) ; id., *l.c.* p. 140 (1877).
Hemaris fumosa, Butler, *Trans. Zool. Soc. Lond.* ix. p. 518. n. 2. (1877) ; id., *l.c.* p. 634 (1877) ; Maass., *l.c.* xli. p. 69 (1880) (= *tenuis*).
**Hemaris metathetis* Butler, *Trans. Zool. Soc. Lond.* ix. p. 519. n. 7 (1877) (Texas ;—Mus. Brit.) ; id., *Papilio* i. p. 103 (1881) ; Maass., *Stett. Ent. Zeit.* xli. p. 51 (1880) (= *axillaris* ex err.) ; Grote, *Canad. Ent.* xviii. p. 130 n. 11 (1886) ; Edw., *Ent. Amer.* iii. p. 223 (1888) ; Smith, *l.c.* xv. p. 91 (1888) (= *thetis*) ; Kirby, *Cat. Lep. Het.* i. p. 627. n. 26 (1892).
Macroglossa tenuis, Pilate, *Papilio* ii. p. 67 (1882) (Dayton, O., rare).
Hemaris diffinis, Beutenmüller, *Bull. Amer. Mus. N. Sc.* vii. p. 278. t. 2. f. 4 (1895) (N. York ; v. vi. vii. viii.).

♂ ♀. Variable in size, and also somewhat in colour. Border of forewing even. The spring form.

b'. H. diffinis diffinis f. aest. *diffinis.*

**Macroglossa diffinis* Boisduval, *l.c.* ; id., *Spec. Gén. Lép. Hét.* i. p. 366. n. 54 (1875) (larva excl.).
Sesia diffinis, Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 129 (1839) ; Walk., *List Lep. Ins. B.M.* viii. p. 81. n. 3 (1856) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 129. n. 1 (1859) ; Morris, *Cat. Lep. N. Am.* p. 17 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 148. n. 1 (1862) ; Harris, ed. Flint, *Ins. Inj. Veg.* p. 328 (1862) ; Mead, *Canad. Ent.* ii. p. 157 (1870) (larva) ; Bowl., *ibid.* iii p. 143 (1871) (Quebec) ; Grote, *ibid.* iii. p. 101 (1871) (Alabama) ; Lintn., *Ent. Contr.* i. p. 40 .190 (1872) ; id., *l.c.* ii. p. 157 (1873).
Sesia fuciformis?, Emmons, *Nat. Hist. N. York* p. 221. t. 32. f. 10 (1854).
Hemaris diffinis, Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 5. 18. t. 1. f. 8 (1874) ; Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., E. v.—M. vi.) ; Grote, *l.c.* ii. p. 224. n. 4 (1875) ; id., *l.c.* iii. p. 220. n. 6 (1877) (Canada ; N. York ; Mass.) ; Mart., *Trans. Dept. Agr. Illin.* xviii. *App.* p. 99 (1880) ; Coq., *ibid.* p. 160 (1880) ; Reed, *Rept. Ent. Soc. Ontario* xii. p. 50 (1882) (larva) Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine) ; Grote, *Hawk Moths N. Am.* p. 26 (1886) ;

id., *Canad. Ent.* xviii. p. 130. n. 8 (1886); id., *l.c.* xix. p. 79 (1887); Smith, *Trans. Amer. Ent. Soc.* xv. p. 96 (1888); Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 38 (1889) (liter. rel. to metam.); Kirby, *Cat. Lep. Het.* i. p. 626. n. 21 (1892); Rowl., *Ent. News* v. p. 178 (1894) (larva); Cross, *ibid.* vii. p. 297 (1896) (N. Hampshire); Rowl., *ibid.* ix. p. 191 (1898) (Missouri); id., *l.c.* x. p. 12 (1899) (Missouri, larva noticed); Smyth, *Ent. News* xi. p. 584 (1900) (summer form of *tenuis*).

**Hemaris marginalis* Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 6. 18. t. 1. f. 10 (♀) (1874) (Michigan;—Mus. Brit.); id., *l.c.* ii. p. 224. n. 5 (1875); id., *l.c.* iii. p. 220. n. 7 (1877) (Mich.; Ohio; Ind.); Butl., *l.c.* ix. p. 521. n. 17 (1877); Maass., *l.c.* xli. p. 51 (1880) (= *axillaris*); Jew., *Canad. Ent.* xii. p. 231 (1880) (Ohio, larva on *Lonicera sempervir.*); id., *Bull. Brooklyn Ent. Soc.* iv. p. 17 (1883) (life hist.); Grote, *Canad. Ent.* xviii. p. 130. n. 8 (1886); id., *Hawk Moths N. Am.* p. 26 (1886); Smith, *l.c.* xv. p. 95 (1888); Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 38 (1889) (liter. rel. to metam.).

Macroglossa marginalis, Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O., common).

♂♀. A summer form. Border of forewing slightly dentate, or at least crenulate. Generally somewhat larger than the preceding.

c'. H. diffinis diffinis f. aest. *axillaris*.

**Sesia axillaris* Grote & Robinson, *Trans. Amer. Ent. Soc.* ii. p. 180 (1868) (Texas;—Mus. Brit.).

Hemaris axillaris Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 6. 18. t. 1. f. 9 (1874); id., *l.c.* ii. p. 224. n. 6 (1875); id., *l.c.* iii. p. 220. n. 8 (1877) (Texas); Butl., *l.c.* ix. p. 521. n. 16 (1877) (= *grotei*); Streck., *l.c.* p. 140 (1877); Grote, *Canad. Ent.* xviii. p. 130. n. 10 (1886); id., *Hawk Moths N. Am.* p. 26 (1886); Edw., *Papilio* iii. p. 25 (1883) (N. Jersey); Smith, *l.c.* xv. p. 95 (1888); Bentenm., *Bull. Amer. Mus. N. Sc.* vii. p. 279 (1895) (N. York, very rare).

**Sesia grotei* Butler, *Ann. Mag. N. H.* (4). xiv. p. 365 (1874) (Texas;—Mus. Brit.).

Macroglossa aethra Strecker, *l.c.* p. 107 (1875) (Montreal).

Hemaris aethra, Butler, *l.c.* ix. p. 634 (1877); Maass., *l.c.* xli. p. 69 (1880) (= *diffinis*); Grote, *Canad. Ent.* xviii. p. 130 n. 6 (1886); Smith, *l.c.* xv. p. 93 (1888) (= *diffinis*); Kirby, *Cat. Lep. Het.* i. p. 626. n. 22 (1892).

Hemaris grotei, Edwards, *Ent. Amer.* iii. p. 223 (1888).

♂♀. A second summer form. Border of forewing with prominent teeth.

Hab. Atlantic district of Nearctic Region, from Texas to Canada, in the north westwards to the Pacific.

In the Tring Museum:—

f. *tenuis*, 60-odd specimens from: S. Antonio, Texas; Quincy, Illinois, iv. v. vi.; Tioga Co., Penn.; Buffalo, v.; Maine; N. Westminster, Brit. Col., iv. (Wilson).

f. aest. *diffinis* 21 ♂♂, 8 ♀♀ from: Texas; Nelson Co., W. Va. (Robinson); Iowa, viii. ix.; Quincy, Illinois, vii.; Eureka Springs, Arkansas, vii.; Canada.

f. aest. *axillaris* 7 ♂♂, 2 ♀♀ from: Eureka Springs, Arkansas, vii.; Quincy, Illinois, vii. viii. ix.; Iowa; Volga, S. Dakota.

b. H. diffinis senta.

Macroglossa senta Strecker, *Rept. Chief Engineer* 1878, *App.* p. 1858. t. e. f. 1 (1879) (N. Mexico).

Hemaris senta, Grote, *Canad. Ent.* xviii. p. 130. n. 5 (1886); Smith, *l.c.* xv. p. 93 (1888) (N. Mexico) (= *rubens*); Kirby, *Cat. Lep. Het.* i. p. 627. n. 28 (1892).

Hemaris rubens, Hanham, *Canad. Ent.* xxxi. p. 49 (1899) (Manitoba).

♂♀. Resembling somewhat *diffinis* f. *tenuis*, body slenderer, legs more grey; abdominal area of hindwing above reddish distally, with a grey space, wing-borders altogether more reddish. Middle of tail of the colour of the two previous segments.

A ♂ from Bear Creek, Morrison Co., Colorado, Sept. 17th, 1901, 10,000 ft. (Oslar), the only specimen we have from that district, differs from all our other examples in the wing-borders being obviously broader, dentate, and nearly as bright

red as the apical costal patch of the forewing (summer brood? Onr other dated individuals of *senta* were caught in May).

Hab. Rocky Mountains, from New Mexico to Montana.

In the Tring Museum 54 specimens from: New Mexico; Colorado (Oslar); Clear Creek, Berkeley (v.), Platte Cañon (7500 ft.), Colorado Springs, Ft. Collins; Montana.

c. H. diffinis thetis.

**Macroglossa thetis* Boisduval, *Bull. Soc. Ent. France* p. 32 (1855) (Calif.;—coll. Charles Oberthür).

♂ ♀. Legs totally black, or hindtibia with pale hairs near base; tail entirely black.

Two principal forms, which are not seasonal :—

d'. H. diffinis thetis f. *thetis.*

**Macroglossa thetis* Boisduval, *l.c.*; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 192 (1865); Boisd. *Ann. Soc. Ent. Belg.* xii. p. 65 (1869); Grote & Rob., *Trans. Amer. Ent. Soc.* iii. p 172 (1870); Boisd., *Spec. Gén. Lép. Hét.* i. p. 368. n. 57 (1875).

Sesia thetis, Grote & Rob., *Trans. Amer. Ent. Soc.* i. p. 325. t. 6. f. 36 (1868).

Hemaris thetis, Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 5. 18. t. 1 f. 7 (1874); Edw., *Proc. Calif. Ac. Sc.* vi. p. 87 (1876) (coast range, v. vi.); id., *l.c.* ii. p. 224. n. 1 (1875); id., *l.c.* iii. p. 220. n. 1 (1877) (Calif.); Butl., *l.c.* ix. p. 519. n. 6 (1877); Grote, *Canad. Ent.* xviii. p. 130. n. 2 (1886); Smith, *l.c.* xv. p. 90 (1888) (Calif.); Kirby, *Cat. Lep. Het.* i. p. 627. n. 25 (1892).

Hemaris palpalis Grote, *Bull. Buffalo Soc. N. Sc.* ii. p. 145. 224. n. 2 (1875) (Gilroy); Edw., *Proc. Calif. Ac. Sc.* vi. p. 89 (1876) (Gilroy, California, not Gilroy, Brit. Columbia); Grote, *l.c.* iii. p. 220. n. 2 (1877) (California); Butl., *Trans. Zool. Soc. Lond.* ix. p. 519. n. 3 (1877); Grote, *Canad. Ent.* xviii. p. 130 n. 1 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 89 (1888); Kirby, *Cat. Lep. Het.* i. p. 626. n. 23 (1892).

Hemaris rubens Edwards, *Proc. Calif. Ac. Sc.* vi. p. 88 (1876) (Oregon; Lake Tahoe); Grote, *Bull Buffalo Soc. N. Sc.* iii. p. 220. n. 3 (1877); id., *Canad. Ent.* xviii. p. 130. n. 4 (1886); Smith, *l.c.* xv. p. 92. t. 4. f. 2 (genit.) (1888) (Oregon; Calif.); Kirby, *Cat. Lep. Het.* i. p. 627. n. 27 (1892); Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (Oregon, ex coll. Hy. Edwards).

♂ ♀. Hindtibia with a tuft of pale hairs near base, or nearly entirely pale-haired; besides abdominal tergites 6 and 7, generally also middle of tergite 5 pale; some specimens have the fifth tergite, however, black like the fourth. Size variable; our summer specimens from Arizona are as large as *diffinis* f. aest. *diffinis*, and have the wing borders far more red than ordinary *thetis*. Possibly the summer brood, at least of the southern districts of the range of *thetis*, are mostly large and reddish on the wing; if that is the case, the form should be kept separate as f. aest. *rubens*.

We doubt that the yellow colour of the palpi of the individual called *palpalis* was natural; the specimen, if preserved, should be carefully examined; possibly the yellow colour is due to the presence of pollen.

d'. H. diffinis thetis f. *cynoglossum.*

Hemaris cynoglossum Edwards, *Proc. Calif. Ac. Sc.* vi. p. 88 (1876) (Calif.; Vancouver I.); Grote, *Bull. Buffalo Soc. N. Sc.* iii. p. 220. n. 4 (1877); Butl., *Papilio* i. p. 103 (1881); Grote, *Canad. Ent.* xviii. p. 130. n. 3 (1886); Smith, *l.c.* xv. p. 91 (1888) (Calif.; Vancouver); Kirby, *Cat. Lep. Het.* i. p. 627. n. 30 (1892); Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (3 specim. ex coll. Hy. Edwards).

♂ ♀. Hindtibia quite black; fifth abdominal tergite black like fourth, seldom at each side of middle of the colour of the sixth and seventh. No structural difference from f. *thetis*.

Hab. Pacific district of Nearctic Region, from British Columbia to Arizona.

In the Tring Museum :—

f. *thetis*, 22 ♂♂, 9 ♀♀ from : Prescott, Arizona, vi. vii. (Dr. Kunze) ; Copper Basin, vii., 7000 ft., and Jerome, vi., 7500 ft., Arizona (J. E. Oslar) ; Pasadena, Calif. ; Gold Hill, Oregon (Biedermann) ; South Utah, vii.

f. *cynoglossum* in the British Museum and coll. W. Schaus.

378. Haemorrhagia brucei.

Hemaris brucei French, *Canad. Ent.* xxii. p. 133. (1890) (Colorado) ; Kirby, *Cat. Lep. Het.* i. p. 627. n. 29 (1892) ; Skinner, *Ent. News* xi. p. 380 (1900) (Wasatch Mts., Utah, common at high altitudes).

♂ ♀. Very near *H. diffinis senta*, but more shaggy ; legs nearly, and underside of abdomen entirely, grey. Not structurally different.

Hab. Central district at high altitudes : Colorado ; Utah.

In the Tring Museum 22 ♂♂, 10 ♀♀ from : South Utah, vi. ; Silver Lake, Utah, vii. ; Rio de los Pinos, Colorado, v. ; South Park, Col., 10,000 ft., vi. viii. (Oslar) ; Chimney Gulch, Col., 8000 ft., v. (Oslar) ; Platte Cañon, Col., 8000 ft., v. (Oslar).

As this insect occurs together with *H. diffinis senta*, and is always distinguishable, we consider it distinct in spite of the absence of structural differences.

379. Haemorrhagia tityus.

Sphinx tityus Linné, *Syst. Nat.* ed. x. p. 493. n. 2 (1758) ; Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 170 (1882).

As *fuciformis* is undoubtedly the correct name for the broad-bordered Palaearctic species we do not see any objection against the employment of the name *tityus* for the narrow-bordered one. Linné's description applies equally well to all the clear-winged species ; the unpublished description referred to by Aurivillius, *l.c.*, fits the insect figured by Esper as *bombyliformis*. As Linné treated, in 1767, *tityus* as a variety of *fuciformis*, we may safely assume that he knew indeed both the broad border and the narrow border, but was not convinced of their specific distinctness.

The name of *bombyliformis*, applied by Esper and others to the present species, and misapplied by Illiger and most Continental Lepidopterists to *fuciformis*, cannot stand for the narrow border, for the character "*abdomine coccineo*," and the fact that Linné treated *bombyliformis* in 1767 as a variety of *porcellus*, speak decidedly against the type of *bombyliformis* having been the narrow border, while the character "*ano barbato*" does not fit *porcellus* ; "*alis hyalinis luteo variis*" might apply to a fresh specimen of *Haemorrhagia* that has not lost the scales, but also to a strongly rubbed *porcellus*.

The names *tityus* for the narrow border, and *fuciformis* for the broad border, are easily remembered if we keep in mind that, *fuciformis* feeding on *Galium*, and *tityus* on *Scabiosa*, the initials of the insect and these food-plants are neighbours in the alphabet, and further, that *tityus* is *tenuiter marginatus* (has a thin border), and that *fuciformis* is "*fortiter*" *marginatus*.

♂ ♀. Hook of antenna shorter than in *fuciformis* and the allied species, third and fourth segment (counted from end) broader. Cell of forewing without scaled fold. Hindtibia black at end. Border of forewing sometimes slightly dentate.

♂. Tenth segment as in *fuciformis*. Claspers different (Pl. LI. f. 20) ; left

one broader than in *fuciformis*, not spatulate, harpe represented by an obviously spinose hump ; right clasper narrowed in apical third, harpe produced into a clubbed process which is armed at end with spines. Penis-funnel (p-f) rough with granules only at end, produced into a slender lobe ; process of penis-sheath longer than in *fuciformis*, acutely pointed.

Larva with a broad ventral band, and a lateral and dorso-lateral series of spots, which are brown-red, the lateral spots oblique, including the stigmata ; horn straight, brown-red.—Food-plants : *Scabiosa* and allied genera ; rarely on other plants.

Hab. Palaearctic Region, from Western Europe to Thibet ; represented in the Pacific district by *radians* and *staudingeri*.

Two subspecies :

a. H. tityus alaiana subsp. nov.

Macroglossa fuciformis, Grum-Grsch., in Rom., *Mém. Lép.* iv. p. 514. n. 211 (1890) (Alai Mts.).

♂ ♀. Black belt of abdomen much shaded with luteous hairs, tail scarcely with any luteous hairs ; thorax and posterior abdominal segments less bright yellow than in *tityus tityus*. Border of forewing broader than in the other form, as broad between R^3 and M^1 as this cellule is wide at end ; cross-veins with an obvious bar, which is nearly as prominent as in *fucif. affinis* ; base of hindwing above and below less yellow than in *tityus tityus*.

A more generalised form than the ordinary *tityus*.

Hab. Alai Mts.

In the Tring Museum 1 ♂ (*type*), 1 ♀, ex coll. Grum-Grschmailo.

b. H. tityus tityus.

Bradl., *Works of Nature* p. 158. t. 24. f. c (1721) ; Roes., *Ins. Belust.* iii. p. 232. t. 38. f. 1 (*l.*) (1755) ; Gronov., *Act. Helv.* v. p. 141. n. 314 (1762) ; Schaeff., *Ins. Ratisb.* t. 16. f. 1 (1766) ; id., *Elem. Ent.* t. 116. f. 3 (1766) ; Ernst & Engr., *Pap. Eur.* iii. p. 24. t. 89. f. 117. e. f. (1782).

Sphinx tityus Linné, *Syst. Nat.* ed. x. p. 493. n. 2 (1758) (in reg. calid. !) ; Anriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 170 (1882) (recens. critica).

Sphinx bombyliformis Linné, *Syst. Nat.* ed. x. p. 493. n. 27 (1758) (Europa ; haec spec. ?) ; Esp., *Schmett. Eur.* ii. p. 180. n. 30. t. 23. f. 2 (1779) ; Lang, *Verz. Augsb.* ii. p. 72. n. 579. 580 (1782) ; Fuessly, *N. Mag.* ii. p. 200. n. 1 (1785) ; id., *l.c.* iii. p. 153. n. 88 (1786) ; Borkh., *Eur. Schm.* ii. p. 55. n. 2 (1789) ; View., *Tabell. Verz. Braudenb.* p. 13. n. 2 (1790) ; Schwarz, *Raupenkal.* p. 635 (1791) ; Borkh., *Rhein. Mag.* i. p. 314. n. 318 (1793) ; Hoffm., *Naturf.* xxviii. p. 80 (1899) (larva) ; Schrank, *Fauna boica* ii. p. 231. n. 1396 (1804) ; Hübn., *Samml. Eur. Schm., Sphing.* t. 9. f. 56 (1805—?) ; id., *Gesch. Schm.* ii. *Sphing.* iii. *Leg.* A. a. f. 1a (1806—?) ; Lnc., *Lép. Eur.* p. 108. t. 44 (1834).

(?) *Sphinx porcellus* β. *Sphinx bombyliformis* Linné, *Syst. Nat.* ed. xii. p. 801. sub n. 18 (1767).

Sphinx fuciformis β. *Sphinx tityus* id., *l.c.* p. 803. sub n. 28 (1767).

Sphinx porcellus β, *bombyliformis*, Goeze, *Ent. Beytr.* iii. 2. p. 170 (1780).

Sphinx fuciformis, Poda, *Mus. Graec.* p. 82. n. 9. t. 2. f. 6 (1761) ; Den. & Schiff., *Verz. Schm. Wien* p. 44. n. 1 (1776) (partim) ; Illig., in Den. & Schiff., *Verz. Schm. Wien* ed. ii. p. 22 (1800) ; Lasp., in Illig., *Mag.* ii. p. 37 (1803) ; Ochs., *Schm. Eur.* ii. p. 185. n. 1 (1808).

Sesia fuciformis, Fabricius, *Syst. Ent.* p. 548. n. 5 (1775) (partim) ; id., *Spec. Ins.* ii. p. 156. n. 11 (1781) (partim) ; id., *Ent. Syst.* iii. 1. p. 382. n. 12 (1793) ; Walk., *List Lep. Ins. B. M.* viii. p. 80. n. 1 (1856) (partim).

Sphinx musca Retzius, *Gen. Ins.* p. 33. n. 23 (1783).

Setia fuciformis, Oken, *Lehrb. Naturg.* iii. 1. p. 749. n. 1 (1815).

Macroglossa fuciformis, Ochsenheimer, *Schm. Eur.* iv. p. 42. n. 1 (1816) ; Frey., *Beitr. Schm.* ii. p. 26. t. 56 (1829) ; Meig., *Handb. Schm.* p. 92. n. 2 (1827) ; Boisd., *Ind. Meth.* p. 32 (1829) ; Cant., in Silberm., *Rev. Ent.* i. p. 76 (1833) (Dept. du Var) ; Thon, *Nat. Schm.* p. 102. t. 51. f. 709. 710 (1837) ; Zett., *Ins. Lapp.* p. 918 (1840) ; Ramb., *Faune Andal.* p. 123 (1842) (Grenada)

Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847) ; Mann, *Wien. Ent. Monatschr.* iii. p. 91 (1859) (Sicily) ; id., *l.c.* vi. p. 365 (1862) (Brussa, v.) ; Snell., *Vlind. Nederl.* p. 90 (1867) (v. vi.) ; Led., *Ann. Soc. Ent. Belg.* xiii. p. 28 (1870) (Caucasus ; Talysch) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 365. n. 53 (1875) ; Oberth., *Ét. d'Ent.* i. p. 31 (1876) (Lambèze, Alg.) ; Staud., *Hor. Soc. Ent. Ross.* xiv. p. 301 (1878) (N. Persia) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 46 (1880) ; Rom., *Mém. Lép.* i. p. 73 (1884) (Istissu ; Kasikoporan) ; Lampa, *Ent. Tidskr.* vi. p. 27. n. 124 (1889) ; Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889) ; Hofm., *Raup. Grossschm.* p. 31. t. 9. f. 3 (1893) ; id., *Grossschm.* p. 31. t. 18. f. 12 (1894) ; Kill. & Caf., *Jahrb. Nat. Ges. Graub.* xxxviii. *App.* p. 20 (1895) ; Vos, *Tijdschr. Ent.* xli. p. 80 (1898) (Apeldoorn) ; Bartel, in Rühl, *Grossschm.* ii. p. 234 (1900).

Hemaris bombyliformis, Dalman, *Kongl. Sv. Vet. Ak. Handl.* p. 207 (1816).

Sesia bombyciformis, Samouelle, *Ent. Comp.* p. 244 (1819).

Cephonodes bombyliformis, Hübner, *Verz. bek. Schm.* p. 131. n. 1403 (1882) (partim).

Sesia bombyliformis, Curtis, *Brit. Ent.* i. t. 40 (1824) ; Westw. & Humphr., *Brit. Moths* p. 26, t. 6. f. 4. 5. 6 (1843).

Sesia fuciformis, Stephens, *Illust. Brit. Ent., Haust.* i. p. 134. n. 1 (1828) ; id., *Cat. Brit. Ins.* ii. p. 34 (1829).

Macroglossa bombyliformis, Meigen, *Enr. Schm.* p. 125. n. 1. t. 62. f. 8 (1830) ; Wallengr., *Skand. Het. Fjär.* p. 56. n. 2 (1863) ; Siebke, *Enum. Ins. Norv.* iii. p. 26. n. 2 (1874) ; Barrett, *Lep. Brit. Is.* ii. p. 73. n. 3. t. 54. f. 3. 3*a* (*l.*, *i.*) (1895).

Macroglossa scabiosae, Zeller, *Stett. Ent. Zeit.* xxx. p. 387 (1869).

Macroglossa kuantiae id., *l.c.* (1869).

Hemaris fuciformis, Butler, *Trans. Zool. Soc. Lond.* ix. p. 520. n. 10 (1877).

Hemaris tityus, Kirby, *Cat. Lep. Het.* i. p. 626. n. 19 (1892) ; Tutt, *Brit. Lep.* iii. p. 528 (1902).

Hemaris scabiosae, Staud. & Reb., *Cat. Lep.* ed. iii. p. 105. n. 774 (1901) (partim).

♂♀. There is little variation observed, except in size. The border of the forewing is never prominently dentate, but specimens corresponding to *radians* f. *radians* can doubtless be artificially produced.

Hab. Western Europe, North Africa, eastwards to the Altai and Kuku-nor, North Persia, Asia Minor.

In the Tring Museum 30-odd specimens from various places in Europe ; 2 ♂♂ from Kuku-nor (received from R. Tancré).

380. **Haemorrhagia radians.**

**Sesia radians* Walker, *List Lep. Ins. B. M.* viii. p. 84 n. 8 (1856) (Shanghai ;—Mus. Brit.).

Hemaris radians, Kirby, *Cat. Lep. Het.* i. p. 625. n. 10 (1892) (= *mandarina*) ; Leech, *Trans. Ent. Soc. Lond.* p. 295. n. 85 (1898) (Oiwake ; Yokohama ; Gensan ; Hakodate ; Fushiki ; Kiukiang) ; Bartel, in Rühl, *Grossschm.* ii. p. 233 (1900) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 105. n. 773 (1901).

Hemaris fuciformis, Bartel, *l.c.* p. 234 (1900).

♂♀. Nearest to *tityus*. Upperside of foretibia and -tarsus black ; apical third of hindtibia blue-black like upperside of tarsus. Thorax and basi-abdominal area of hindwing above, and basal areas of both wings below, deep chrome. Scaling of cross-veins of forewing heavier than in *tityus*, cell-fold distinct or vestigial, seldom practically absent.

♂. Sexual armature essentially as in *tityus* ; the tenth sternite more asymmetrical, being obliquely rounded at end (Pl. XLIII. f. 23), both claspers a little more spatulate.

Early stages not known.

Two forms :

a'. H. radians f. *mandarina*.

**Hemaris mandarina* Butler, *Proc. Zool. Soc. Lond.* p. 239. n. 2. t. 35. f. 2 (1875) (Shanghai ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 520. n. 9 (1872).

Macroglossa fuciformis, Graeser, *Berl. Ent. Zeitschr.* xxxii. p. 106. n. 196 (1888) (Amurld., June) ; Staud., in Rom., *Mém. Lép.* vi. p. 241. n. 232 (1892) (Amurland).

**Macroglossa fuciformis* var. *brunneobasalis* id., *l.c.* (coll. Standinger) ; Bartel, in Rühl, *Grossschm.* ii. p. 238 (1900).

Hemaris scabiosae var. *brunneobasalis*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 105. sub n. 774 (1901).

♂ ♀. Border of forewing not dentate.

b'. H. radians f. *radians*.

**Sesia radians* Walker, *l.c.* (Shanghai).

Macroglossa radians, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 373. n. 65 (1875) ; Fixs., in Rom., *Mém. Lép.* iii. p. 323 n. 102 (1887) (Corea, vii.) ; Staud., in Rom., *Mém. Lép.* vi. p. 242. n. 233 (1892) (Amurland).

Hemaris radians, Butler, *Trans. Zool. Soc. Lond.* ix. p. 520. n. 14 (1877) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* ii. p. 3. t. 21. f. 2 (1878) ; Leech, *Tr. Ent. Soc. Lond.* p. 121. n. 107 (1889) (Kiukiang).

♂ ♀. Border of forewing more or less heavily dentate. Intergradations between the two forms not rare.

Hab. Both forms in China, Amurland, and Japan : f. *radians* apparently more common in Japan than on the continent.

In the Tring Museum :—

f. *mandarina*, 4 ♂♂, 4 ♀♀ from : Oiwake ; Nagasaki, v. (Leech) ; Loo Choo (Pryer) ; Amur.

f. *radians*, 25 ♂♂, 10 ♀♀ from : Nagasaki, v. (Leech) ; Yokohama, vii. ; Makoyama, viii. ; Amur ; Gensan, Corea, vii. (Leech).

381. **Haemorrhagia fuciformis.**

Sphinx fuciformis Linné, *Syst. Nat.* ed. x. p. 493. n. 28 (1758).

♂ ♀. The broad-bordered species, feeding on *Galium* and *Lonicera*, is undoubtedly the insect which Linné described as *fuciformis*. The figures quoted by him represent the broad-bordered Sphinx ; the reference to Bradley, *Works of Nature*, is very significant, as Linné quotes only Bradley's fig. B, and not fig. C, which latter is the narrow-bordered species.

Individually, seasonally, and geographically variable. Spines at tip of fore-tibia rather more prominent than in the other species. A scaled line in cell, and a heavy bar on cross-veins of forewing. Antenna see Pl. LX. f. 11. 18. 19.

♂. Tenth tergite (Pl. XLIII. f. 21) scarcely more than twice as long as proximally broad, the two halves separated only at the extreme end ; sternite (Pl. XLIII. f. 22) about one-third shorter than the tergite, slightly asymmetrical, rounded at end. Claspers (Pl. LI. f. 19) : left one spatulate, harpe represented by a basal incrassation which bears a few short bristles ; right clasper with dorsal margin concave, and ventral margin deeply sinuate just beyond middle, apical lobe spatulate, harpe represented by a conical process, which varies individually and is clothed with bristles. Penis-funnel (Pl. LI. f. 19, P-F) rough with setiferous granules, little more produced ventrally than dorsally ; penis-sheath : apical process flattened, obtuse.

Larva with pale dorso-lateral line from head to horn ; stigmata bordered with brown-red, a ventro-lateral brown-red line from head to anus, including legs ; horn slightly but obviously curved, brown-red.—Food-plants : *Galium* ; *Lonicera* ; *Symphoricarpus*.

Hab. Palaearctic Region, except the far north, from Western Europe to Japan and N.W. India.

Three subspecies ;

a. II. fuciformis fuciformis.

Mouff., *Ins. Theatr.* p. 105 (1634); Bradl., *Works of Nature* p. 158. t. 24. f. B (1721); Roesel, *Ins. Belust.* iii. p. 232. t. 38. f. 2. 3 (1755); Hemmerich, *Coll. Curious Ins.* t. 9. f. e (175–?): Roesel, *l.c.* iv. t. 34. f. 1–4 (1761); Sulz., *Kennz. Ins.* p. 36. t. 15. f. 90 (1761): Geoffr., *Hist. Ins.* ii. p. 82. n. 5 (1762); Harris, *Engl. Lep.* p. 14. n. 87 (1775); Ernst & Engr., *Pap. Eur.* iii. p. 24. t. 89. f. 117, t. 90. f. 117 (1782).

Sphinx fuciformis Linné, *Syst. Nat.* ed. x. p. 493. n. 28 (1758); id., *Fauna Suec.* p. 289 (1761); Scop., *Fauna Carn.* p. 188. n. 475 (1763); Linné, *Syst. Nat.* ed. xii. p. 803. n. 28 (1767) (partim); Fuessly, *Verz. Schweiz. Ins.* p. 33. n. 623 (1775); Den. & Schiff., *Verz. Schm. Wien* p. 44 (1776) (partim); Fuessly, *Mag. Ent.* i. p. 267 (1778); Esp., *Eur. Schm.* ii. p. 118. t. 14. f. 1. a. b. c. (*♂ p., ♀*) (1779); Goeze, *Ent. Beytr.* iii. 2. p. 180. n. 28 (1780) (partim); Lang, *Verz. Augsb.* ii. p. 71. n. 576–578 (1782); Harris, *Exp. Engl. Ins.* p. 52. t. 13. f. 2 (1783); Borkh., *Eur. Schm.* ii. p. 52 (1789); Rossi, *Fauna Etr.* ii. p. 164. n. 1059 (1790); Gmel., *Syst. Nat.* i. 5. p. 2388. n. 28 (1790); Schwarz, *Raupenkal.* p. 53. 201. 360. 493 (1791); Borkh., *Rhein. Mag.* i p. 313. n. 137 (1793); Don., *Nat. Hist. Brit. Ins.* iii. p. 37. t. 87 (1794); Walck., *Faune Paris.* ii. p. 280 (1802); Schrank, *Fauna Boica* ii. p. 230. n. 1395 (1804); Hübn., *Samml. Eur. Schm., Sphing.* p. 93. t. 9. f. 55 (1805–?); id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. *Leg.* A. a. f. 2. a. b (1806–?); God., *Lep. France* iii. p. 58. t. 19. f. 4 (1821); Frey., *Beytr. Schm.* t. 50 (1829); Luc., *Lép. Eur.* p. 108. t. 44 (1834).

Sphinx variegata Allioni, *Mél. Soc. Turin.* p. 193 (1766).

Sphinx faciformis (!), Müller, *Naturs.* v. 1. p. 643. n. 28 (1774).

Sesia fuciformis, Fabricius, *Syst. Ent.* p. 548. n. 5 (1775) (partim); id., *Spec. Ins.* ii. p. 156. n. 11 (1781) (partim); id., *Mant. Ins.* ii. p. 99. n. 11 (1787); id., *Ent. Syst.* iii. 1. p. 382. n. 12. (1793) (partim): Cederh., *Fauna Ingr.* p. 214. n. 656 (1798); Westw. & Humphr., *Brit. Moths* i. p. 26. t. 6. f. 7 (1843).

Sphinx bombyliformis, Illiger, in Den. & Schiff., *Verz. Wien* ed. ii. p. 22 (1800); Lasp., in Illig., *Mag.* ii. p. 37 (1803); Ochs., *Schm. Eur.* ii. p. 189. n. 2 (1808); Treitschke, *Hülfsb. Schm.* p. 160. n. 2 (1844).

Setia bombyliformis, Oken, *Lehrb. Naturg.* iii. 1. p. 750. n. 2 (1815).

Sesia fusiformis (!), Leech, in Brewst., *Enc.* iv. p. 131 (1815); Samouelle, *Ent. Comp.* p. 244 (1819).

Macroglossa bombyliformis, Ochsenheiner, *Schm. Eur.* iv. p. 42. n. 2 (1816); Meig., *Handb. Schm.* p. 92. n. 1 (1829); Cant., in Silberm., *Rev. Ent.* i. p. 76 (1833) (Dept. Var); Thon, *Nat. Schm.* p. 102. t. 51. f. 712—715 (1837); Zett., *Ins. Lapp.* p. 918 (1840); Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847); Mann, *Wien. Ent. Monatschr.* v. p. 158 (1861) (Amasia); id., *l.c.* viii. p. 175 (1864) (Brussa); Snell., *Vlind. Nederl.* p. 90 (1867) (v. vi.); Led., *Ann. Soc. Ent. Belg.* xiii. p. 2 (1870) (Caucasus); Boisd., *Spec. Gén. Lép. Hét.* i. p. 367. n. 55 (1875); Staud., *Hor. Soc. Ent. Ross.* xiv. p. 301 (1878) (Amasia); Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 46 (1880); Sand., *Ent. Tidskr.* ii. p. 213 (1881); Rom., *Mém. Lép.* i. p. 73 (1884) (Tiflis; Borjoum., etc.; E. v. vi.); Lampa, *Ent. Tidskr.* vi. p. 27. n. 133 (1885); Hofm., *Raup. Grossschm. Eur.* p. 31. t. 9. f. 20 (1893); id., *Grossschm. Eur.* p. 31. n. 3. t. 18. f. 11 (1894); Kill. & Cafl., *Jahrb. Nat. Ges. Graub.* xxxviii. *App.* p. 20 (1895); Vos, *Tijdschr. Ent.* xli. p. 80 (1898) (Apeldoorn); Herz, *Iris* xi. p. 250. n. 92 (1898) (Witin; Wilui); Bartel, in Rühl, *Grossschm.* ii. p. 223 (1900).

Sphynx fuciformis, Vogel, *Schmett. Cabinet* ii. p. 20. t. 8. f. 7 (1822).

Cephonodes bombyliformis, Hübner, *Verz. bek. Schm.* p. 131. n. 1403 (1822) (partim).

Sesia bombyliformis, Stephens, *Illustr. Brit. Ent., Haust.* i. p. 135. n. 2 (1828); id., *Cat. Brit. Ins.* ii. p. 34 (1829); Walk., *List Lep. Ins. B. M.* viii. p. 79. n. 1 (1856).

Hemaris fuciformis, Dalman, *Kongl. Sv. Vet. Ak. Handl.* p. 207 (1816); Kirby, *Cat. Lep. Het.* i. p. 625. n. 14 (1892); id., *Entom.* xxix. p. 39 (1896); id., in Allen, *Nat. Libr., Moths* iv. p. 5. t. 96. f. 1 (1897); Staud. & Reb., *Cat. Lep.* ed. iii. p. 104. n. 771 (1901); Tutt, *Brit. Lep.* iii. p. 512 (1902).

Macroglossa fuciformis, Meigen, *Eur. Schm.* p. 126. n. 2. t. 62. f. 9 (1830); Wall., *Skand. Het. Fjär.* p. 54. n. 1 (1863); Siebke, *Enum. Ins. Norv.* iii. p. 26. n. 3 (1874); Barrett, *Lep Brit. Is.* ii. p. 70. t. 54. f. 2. 2a (1895).

Macroglossa milesiformis Treitschke, in Ochs., *Schmett. Eur.* x. 1. p. 125 (1834).

Macroglossa bombyliformis var. *milesiformis*, Assmann, *Zeitschr. Ent. Breslau* i. p. 5 (1847); Mann, *Wien. Ent. Monatschr.* iii. p. 91 (1859) (Sicily, vi.); Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889).

Macroglossa loniceræ Zeller, *Stett. Ent. Zeit.* xxx. p. 387 (1869).

Macroglossa caprifolii id., *l.c.* (1869).

Hemaris bombyliformis, Butler, *Trans. Zool. Soc. Lond.* ix. p. 520. n. 10 (1877).
Macroglossa bombyliformis var. *robusta* Alphéraky, *Hor. Soc. Ent. Ross.* xvii. p. 17 (1882).
**Hemaris similima* Moore, *Proc. Zool. Soc. Lond.* p. 391 (1888) (Kangra ;—Mus. Brit.) ; Cot. & Swinh., *Cat. Moths Ind.* p. 725. n. 4 (1889).
Macroglossa bombyliformis var. *heynei* Bartel, *Ent. Nachr.* xxiv. p. 337 (1898) ; id., in Rühl, *Grossschm.* ii. p. 228 (1900) (hybrid between *bomb.* and *fuc.* ? !).
Macroglossa bombyliformis var. et ab. *robusta*, id., *l.c.* p. 227 (1900).
Hemaris fuciformis var. *robusta*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 105. n. 771. b (1901).

♂ ♀. Sides of thorax not essentially paler than middle ; hindwing very rarely with a transparent streak in abdominal border ; bar at end of cell of forewing heavy. The belt of the abdomen is generally reddish, but occasionally black : intergradations occur frequently. The suggestion put forward by Bartel—who has named the black-belted specimens *heynei*, *l.c.*—that we have here to do with a hybrid between *fuciformis* and *tityus* (= *bombyliformis*) has no foundation ; there would be more justification in calling this *H. fucif. fucif.* f. *heynei*, a transition to *H. fuciformis affinis*. Marginal band of both wings ordinarily simple, but not rarely dentate ; the dentition never so strong as in *affinis* f. *alternata*. Such dentate individuals were considered distinct by Treitschke, who named them *milesiformis* ; the abdominal belt of this *H. fucif. fucif.* f. *milesiformis* is occasionally black.

Central Asiatic specimens are not larger than European ones on an average : "var. *robusta*" has no standing.

Hab. Europe (except the far north), North Africa, eastward to the Altai and N.W. India.

In the Tring Museum 3 larvae, 1 pupa, 50-odd specimens from various places in Europe ; 5 ♂♂, 1 ♀ from Issykkul and Alexander Mts.

The N.W. Indian specimens may possibly represent a fourth subspecies. But the two only individuals known (in the Brit. Mus.) are too scanty a material to decide this point, since the differences from *fuc. fuciformis*, if there are any, are certainly only slight. The forewing seems to be a little narrower than in European *fuciformis*.

b. H. fuciformis ganssuensis.

Macroglossa ganssuensis, Grum-Grschm. *Hor. Soc. Ent. Ross.* xxv. p. 461. n. 47 (1891) (Sinin) ; Bartel, in Rühl, *Grossschm.* ii. p. 230 (1900).
Hemaris affinis var. *ganssuensis*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 105. n. 772. b. (1901).

♂ ♀. Nearer *fucif. affinis* than *fucif. fuciformis*. Underside of abdomen entirely grey, proximal sternites not black.

Hab. Thibet ; Amdo.

In the Tring Museum 1 ♂, 1 ♀.

c. H. fuciformis affinis.

Macroglossa affinis Bremer, *Bull. Ac. St. Pétersb.* iii. p. 475. n. 27 (1861) ; id., *Lep. Ost.-Sib.* p. 35. t. 3. f. 13 (1864) ; Staud. & Wocke, *Cat. Lep.* ed. ii. p. 38. n. 497 (1871) ; Oberth., *Et. d'Ent.* v. p. 28. n. 71 (1880) (Amurland, June) ; Staud., in Rom., *Mém. Lép.* vi. p. 240. n. 231 (1892) (Amurland ; partim) ; Bartel, in Rühl, *Grossschm.* ii. p. 230 (1900).
**Macroglossa sieboldi* Orza, *Lép. Japon* p. 35. n. 76 (1868) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 364. n. 52 (1875) (coll. Oberthür).
**Sesia whitelyi* Butler, *Ann. Mag. N. H.* (4). xiv. p. 367 (1874) (Hakodate ;—Mus. Brit.).
Hemaris sieboldi, id., *Trans. Zool. Soc. Lond.* ix. p. 519. n. 9 (1877) (= *whitelyi*) ; Kirby, *Cat. Lep. Het.* i. p. 626. n. 18 (1892).
Hemaris affinis, Butler, *l.c.* ix. p. 520. n. 11 (1877) ; Kirby, *l.c.* n. 20 (1892) ; Leech, *Trans. Ent. Soc. Lond.* p. 295. n. 87 (1898) (= *sieboldi* = *whitelyi* ; Gifu ; Yokohama ; Hakodate, vi.).
Macroglossa bombyliformis, Graeser, *Berl. Ent. Zeitschr.* xxxii. p. 106. n. 195 (1888) (Amurld., July)

♂♀. A very variable insect ; always distinguished from *fucif. fuciformis* by the darker colour of the wing-borders, the thinner bar upon the cross-veins of the forewing, and the obviously pale side of the thorax, or the very heavily dentate wing-borders. The external border of the hindwing is mostly thinner than in the western form, and there is (always ?) a transparent streak in the abdominal border, very seldom found in *fucif. fuciformis*. Certain small specimens come very near *yunnanensis*.

♂. Process of penis-sheath longer than in *fucif. fuciformis*, not quite so broad.

There are two very different-looking forms, hitherto considered specifically distinct. As they are structurally the same, and are, moreover, connected by intergradations, we have no doubt that they are the same species. We keep the two extreme forms and the intermediate one separate, as follows :—

a'. II. fuciformis affinis f. *affinis*.

Macroglossa affinis Bremer, *l.c.*

♂♀. Variable in size ; border of wings not dentate ; thorax pale at sides underside of abdomen more or less extended grey.

b'. II. fuciformis affinis f. *confinis*.

Macroglossa affinis var. ? (ab.) *confinis* (*bombyliformis* var. ?) Staudinger, in Rom., *Mém. Lép.* vi. p. 240. sub n. 231 (1892) (Amurland).
Macroglossa alternata, Bartel, *l.c.* p. 232 (1900).
Hemaris affinis var. *confinis*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 105. n. 772. a (1901) (partim).

♂♀. As before, but wing borders more or less dentate.

c'. II. fuciformis affinis f. *alternata*.

**Sesia alternata* Butler, *Ann. Mag. N. H.* (4). xiv. p. 366 (1874) (Hakodate ;—Mus. Brit.).
Hemaris alternata id., *Trans. Zool. Soc. Lond.* ix. p. 521. n. 15 (1877); id., *Illustr. Typ. Specim. Lep. Het. B. M.* ii. p. 3. t. 21. f. 3 (1878) ; Kirby, *Cat. Lep. Het.* i. p. 625. n. 9 (1892) ; Leech, *Trans. Ent. Soc. Lond.* p. 295. n. 86 (1898) (Yokohama ; Oiwake ; Hakodate ; Gensan, vii. ; Chang Yang).
Macroglossa affinis, Fixsen, in Rom., *Mém. Lép.* iii. p. 323. n. 101 (1887) (Corea) ; Graes., *Berl. Ent. Zeitschr.* xxxii. p. 106. n. 197 (1888) (Amurld., beg. of June, larva on *Lonicera*).
Macroglossa alternata, Bartel, in Rühl, *Grassschm.* ii. p. 232 (1900) (partim).

♂♀. Always large ; thorax and abdomen above brighter yellow than in the previous, reminding one of *radians* ; sides of thorax generally not paler than middle ; border of forewing heavily dentate ; underside of abdomen mostly with little grey scaling, last sternites reddish, with pale mesial line.

This is apparently the commoner form in summer.

Hab. Japan ; Amurland ; Corea ; China.

The first form not yet known from China ; the second not seen from Japan ; the third common in Japan, occurring also in Corea, not quite typical in Amurland and China.

In the Tring Museum :—

f. *affinis*, 15 ♂♂, 9 ♀♀ from : Yokohama, iv. v. vi. viii. ; Mukoyama, v. ; Kami-Yoshida, viii. (Dr. Fritze) : Hakodate, vi. vii. (Leech) ; Amur.

f. *confinis*, 3 ♂♂, 1 ♀ from Amur.

f. *alternata*, 12 ♂♂, 5 ♀♀ from : Oiwake ; Hondo, Kami-Yoshida, viii. (Dr. Fritze) ; Gensan, Corea, vii. (Leech).

382. Haemorrhagia beresowskii (Pl. IX. f. 7, ♂).

Hemaris beresowskii Alphéraky, in Rom., *Mém. Lép.* ix. p. 120. t. 12. f. 9 (♂) (1897) (Se-tschuen, June); Leech, *Trans. Ent. Soc. Lond.* p. 296. n. 88 (1898) (W. China, vi. vii.).
Macroglossa beresowskii, Bartel, in Rühl, *Grossschm.* ii. p. 229 (1900).

♂♀. Closely resembling *H. staudingeri ottonis*, but border of hindwing obviously broader, being as wide between R^3 and M^1 as this cellule is broad at margin. Cell-streak of forewing mostly vestigial: bar upon cross-veins as in *fucif. affinis* or heavier.

♂. Sexual armature essentially as in *staudingeri*: tenth tergite a little shorter, and right clasper narrower before middle, its ventral margin not so obviously sinuate beyond middle.

Hab. China; not yet recorded from the eastern parts of the Celestial Empire.

In the Tring Museum 3 ♂♂ from: Ta-tsien-lu and Siao-lu.

A series in coll. Charles Oberthür.

383. Haemorrhagia staudingeri (Pl. IX. f. 8, ♂).

**Hemaris staudingeri* Leech, *Entom.* xxiii. p. 31 (1890) (Chang-yang, vii.;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 625. n. 11 (1892).
Macroglossa affinis, Staudinger, in Rom., *Mém. Lép.* vi. p. 240. n. 231 (1892) (partim).
Macroglossa alternata, Bartel, in Rühl, *Grossschm.* ii. p. 232 (1900) (partim).

♂♀. Similar to *fucif. affinis* f. *affinis* and f. *confinis*, but cell of forewing without scaled fold, and cross-veins not heavier scaled than M, agreeing in these characters with *tityus*. Base of wings above black or nearly black; base of hindwing below deeper in colour than in *fucif. affinis*. Border of forewing even or dentate.

♂. Tenth tergite (Pl. XLIII. f. 24, ventral aspect) longer than in *fuciformis* and *tityus*, the two halves deeper separate: sternite much broader, strongly asymmetrical, the right edge convex, the left concave beyond middle, apex strongly dilated towards the left side. Left clasper midway between that of *tityus* and *fuciformis*, decidedly slenderer than in *tityus*, and somewhat spatulate, harpe with very few bristles; right clasper as slender as in *fuciformis*, but the ventral margin less deeply and more distally sinuate, the sinus deeper than in *tityus*, but nearly in the same place, harpe ending in a long process as in *tityus*, this process compressed except at end, strongly club-shaped in dorsal and in ventral aspect, much less club-shaped in lateral view, the incrassate end armed with spines, of which those standing on the upperside are nearly as long as the process is broad apically. Penis-funnel not rough with granules, produced ventrally into a pointed process; penis-sheath with acutely pointed process as in *tityus*.

Early stages not known.

Hab. China; Amurland.

Two subspecies:

a. H. staudingeri ottonis subsp. nov.

Macroglossa affinis, Staudinger (*non* Bremer, 1861), *l.c.*

♂♀. Agreeing in colour closely with *fucif. affinis*. Thorax with pale side-stripe; hindtibia yellowish grey except tip.

Hab. Amurland.

In the Tring Museum 3 ♂♂, 3 ♀♀, labelled "Amur," received from German dealers as *affinis*.

b. H. staudingeri staudingeri.

**Hemaris staudingeri* Leech, *l.c.*

♂♀. Proximal half of abdomen more or less deep black, contrasting strongly with the distal segments. Hindtibia black except base.

Hab. China: Chang-Yang.

In the Tring Museum 2 ♂♂ from Chang-Yang, July (Pratt), ex coll. Leech.

384. Haemorrhagia saundersi.

**Sesia saundersi* Walker, *List Lep. Ins. B. M.* viii. p. 83. n. 7 (1856) (N. India ;—Mus. Brit.).
Macroglossa saundersi, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 374. n. 66 (1875).
**Macroglossa curtisi* Boisduval, *l.c.* n. 67 (1875) (Cochinchina ; Silhet ;—coll. Charles Oberthür).
Hemaris saundersi, Butler, *Trans. Zool. Soc. Lond.* ix. p. 520. n. 12 (1877) ; id., *Proc. Zool. Soc. Lond.* p. 378. n. 90 (1886) (Murree, viii. ix., not uncommon) ; Cat. & Swinh., *Cat. Moths Ind.* i. p. 1. n. 4 (1887) (Sikhim) ; Warr., *Proc. Zool. Soc. Lond.* p. 294. n. 6 (1888) (Thundiani, v.) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 2. n. 4 (1892) ; Kirby, *Cat. Lep. Het.* i. p. 626. n. 15 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 119. n. 203. fig. 68 (♂) (1892) (N.W. Himalayas ; Punjab).
Hemaris curtisi, Butler, *Trans. Zool. Soc. Lond.* ix. p. 634 (1877) (= *saundersi ?*) ; Kirby, *l.c.* n. 17 (1892).

♂♀. Similar in appearance to *Cephonodes hylas*, but a true *Haemorrhagia*. Cell of forewing without scaled fold ; marginal band about half as wide between M^1 and M^2 as this cellule is broad at margin. Fifth abdominal tergite brown-red, fourth also more or less of the same colour, sixth often with a brown-red mesial patch ; underside of abdomen brown-red, mesially grey.

♂. Tenth tergite longer and slenderer than in *staudingeri*, left process a little longer than right one ; sternite asymmetrical, curved towards the left side (Pl. XLIII. f. 26). Left clasper (Pl. LII. f. 4, *l*) little projecting ventrad basally, slightly and almost gradually narrowed to apex, process of harpe represented by a small subglobose bump which bears fine hairs ; right clasper less different from the left than in the allied species, less narrowed towards end than the left clasper, its ventral margin feebly sinuate in apical third, harpe produced into a subcylindrical process which is slightly twisted and feebly club-shaped and bears long hairs at the end. Penis-funnel slender, gradually narrowed into a smooth ventral process ; process of penis-sheath long, but not sharply pointed, little thinner than the sheath itself.

Early stages not known.

Hab. North West India to Cochinchina.

In the Tring Museum 8 ♂♂, 1 ♀ from : Kumaon, vii. viii. (Pilcher) ; Gurais Valley, Kashmir, vi. (Leech).

385. Haemorrhagia croatica.

Sphinx croatica Esper, *Schm.* ii. p. 33. t. 45. f. 2 (180 ?) ; Ochs., *Schm. Eur.* ii. p. 191. n. 3 (1808) (= *sesia*).
Sphinx sesia Hübner, *Samml. Eur. Schm., Sphing.* p. 94. n. 3. t. 18. f. 89. & t. 29. f. 136 (180 ?).
Setia croatica, Oken, *Lehrb. Naturg.* iii. 1. p. 750. sub n. 2 (1815).
Macroglossa croatica, Ochsenheimer, *l.c.* iv. p. 42. n. 3 (1816) ; Boisd., *Ind. Meth.* p. 32 (1829) ; id., *Icon. Lép.* ii. p. 13. t. 48. f. 5 (1834) ; Treitschke, in Ochs., *Schm. Eur.* x. p. 127 (1834) (Dalmatia) ; Dup., in God., *Lép. France, Suppl.* ii. p. 27. n. 7. t. 3. f. 3 (1835) ; Frey., *N. Beitr. Schm.* ii. p. 151. n. 326. t. 188 (1836) ; Eversm., *Fauna Volga-Ural.* p. 106 (1844) (v. vi.) ; Walk., *List Lep. Ins. B. M.* viii. p. 87. n. 2 (1856) ; Mén., *En. Corp. Anim. Mus. Petr., Lep.* ii. *Suppl.* p. 95. n. 1586 (1857) ; Mann, *Wien. Ent. Monatschr.* vi. p. 365 (1862) (Brussa, v.) ; Led., *Ann. Soc.*

Ent. Belg. xiii. p. 28 (1870) (Caucasus) ; Stand. & Wocke, *Cat. Lep.* ed. ii. p. 38. n. 494 (1871) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 363. n. 50 (1875) ; Mill., *Icon.* t. 141. f. 7. 8. 9 (1869) ; Stand., *Hor. Soc. Ent. Ross.* xiv. p. 300 (1878) (Asia Min. ; E. v. vi.) ; Rom., *Mém. Lép.* i. p. 72 (1884) (Tiflis, E. iv. v. ; Ordubad) ; Hofm., *Raup. Grossschm.* p. 31. t. 9. f. 1. (1893) ; id., *Grossschm.* p. 31. t. 18. f. 10 (1894) ; Holtz, *Illustr. Zeitschr. Ent.* ii. p. 63 (1897) (Cilicia, July) ; Bartel, in Rühl, *Grossschm.* ii. p. 229 (1900) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 104. n. 769 (1901) (Eur. m. or. ; As. Min. ; Kurd. oc. ; Arm.).

Cephonodes croatica, Hübner, *Verz. bek. Schm.* p. 131. n. 1406 (1822) (= *sesia*).

Sphynx croatica, Vogel, *Schmett. Cabinet* x. p. 11 t. 5. f. 5 (1829).

Hemaris croatica, Butler, *Trans. Zool. Soc. Lond.* ix. p. 523. n. 26 (1877).

Cephonodes (?) croatica, Kirby, *Cat. Lep. Het.* i. p. 628. n. 12 (1892).

Cochrania croatica, Tutt, *Brit. Lep.* iii. p. 503 (1902).

♂ ♀. No transparent spaces on wings. Pulvillus of claw-segment normal ; ventral lobes of paronychium very small. This is a true *Haemorrhagia*. Hübner (and Butler) recognised that it is related to *fuciformis*, not to *stellatarum*.

♂. Tenth tergite as in *tityus*, but longer ; sternite slender, dilated at end and obliquely rounded, asymmetrically spatulate. Claspers nearly as in *tityus*, the right one with scarcely a vestige of the sinus of the ventral edge ; right harpe produced into a curved and club-shaped process, which is armed with spines above at the end; left harpe ending in a spinose lump which is rather more prominent than in *tityus*. Penis-funnel long, slender, produced ventrally ; process of penis-sheath long, but not sharply pointed.

Larva green, whitish green, or red ; a broad pale line from head to horn ; this long and acute ; black ventral and red lateral spots.—Food-plant : *Scabiosa* and (?) *Asperula*.

Hab. Austria-Hungary to Greece, Asia Minor, and Transcaucasia.

In the Tring Museum 30-odd specimens from Dalmatia ; 2 larvae ; 2 pupae.

386. **Haemorrhagia rubra.**

**Hemaris rubra* Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 120. n. 204 (1892) (Sind ; Gurais Valley ; Balta ;—Mus. Brit.).

♂ ♀. Transparent spaces of forewing not sharply defined, shaded over with red-brown scales, sometimes vestigial ; hindwing without vitreous area. Pulvillus very small ; ventral lobes of paronychium vestigial.

♂. Tenth tergite as in *tityus* ; sternite broader at end and more obliquely rounded. Left clasper as in *tityus*, but the basal ventral lobe less projecting ; right clasper feebly sinuate beyond middle at ventral margin, process of harpe longer and slenderer than in *croatica* and *tityus*, with long spines at and before end, equalling in length the diameter of the process. Penis-funnel shaped as in *tityus*, hairy at end ; process of penis-sheath more pointed than in *croatica*, less than in *tityus*.

Early stages not known.

Hab. Kashmir : Sind and Gurais valleys.

In the Tring Museum 4 ♂♂, 1 ♀.

A series from the same places in the British Museum.

387. **Haemorrhagia dentata.**

**Macroglossa ducalis* var. *dentata* Staudinger, *Stett. Ent. Zeit.* xlviii. p. 67 (1887) (Aintab, n. Antiochia ;—coll. Standinger) ; Stand. & Reb., *l.c.* n. 770. a (1901) (Taur. m. or.).

Macroglossa var. (ab.?) *dentata*, Bartel, *l.c.* p. 222 (1900).

♂. Abdomen with buffish white belt of third abdominal segment only vestigial at the sides, not marked above. Tail red, mixed with black. Basal area of hindwing green, and vitreous spaces small. Pulvillus *present*.

♂. Sexual armature similar to that of *fuciformis*, differing essentially from that of *ducalis*. Tenth segment as in *fuciformis*, the tergite being obviously shorter than in *ducalis*. Claspers as in *fuciformis*, less slender; left harpe with a distinct process, similar to that of the right harpe of *fuciformis*, but smaller; right harpe ending in a process which is longer than in *fuciformis*, but far shorter than in *ducalis*, not club-shaped, with hairs at the end. Penis-funnel as in *fuciformis*, stout, truncate, densely beset with pointed granules: penis-sheath ending in a short, flat, obtuse, twisted process, as in *fuciformis*.

♀ and early stages not known.

Hab. Syria.

In the British Museum 1 ♂ from "Syria" (coll. Leech).

388. **Haemorrhagia ducalis.**

**Macroglossa ducalis* Staudinger, *Stett. Ent. Zeit.* xlviii. p. 66 (1887) (Namangan; Transalai, vii.; — coll. Staudinger): Grum-Grsch., in Rom., *Mém. Lép.* iv. p 514. n. 210. t. 18. f. 6 (♂) (1890) (Pamir, June; = *temiri*); Bartel, in Rühl, *Grossschm.* ii. p. 222 (1900) (Fergana; Buchara; Transalai; Pamir).

Macroglossa temiri Grum-Grsch., *l.c.* iii. p. 401. n. 14 (1887) (Pamir).

Lepisesia ducalis, Kirby, *Cat. Lep. Het.* i. p. 628. n. 3 (1892).

Hemaris ducalis, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 104. n. 770 (1901) (Ferg.; Buch. or.; ? Saraw.).

♂♀. Third abdominal tergite with buffish white belt. Hindwing entirely ferruginous, apart from vitreous area. Size of vitreous area not constant either on fore- or hindwing. No pulvillus.

♂. Tenth tergite longer than in *tityus*, left process longer than right one; sternite more spatulate than in *tityus*, more rounded apically, almost symmetrical. Left clasper slenderer than in *tityus*, approaching that of *fuciformis*, process of harpe represented by a conspicuously spinose hump; right clasper ventrally slightly emarginate beyond middle, process of harpe long, slender, slightly club-shaped, upper surface in apical half armed with long spines. Penis-funnel apically rather densely beset with long hairs; process of penis-sheath rather long, not very sharply pointed.

Early stages not known.

Hab. Transcaspia to the Pamir and Alai.

In the Tring Museum 2 ♂♂, 1 ♀ from: Alexander Mts.; Kuliab, N. Afghanistan.

CX. CEPHONODES.—Typus: *hylas*.

Sphinx Linné (*non* id., 1758), *Mant. Plant.* p. 539 (1771).

Sesia Fabricius, *Syst. Ent.* ii. p. 547 (1775) (partim; type: *tantalus*).

Cephonodes Hübner, *Verz. bek. Schm.* p. 131 (1822) (partim; type: *hylas*).

Macroglossum, McLeay (*non* Scopoli, 1773), in King's *Surv. Austr.* ii. p. 465 (1827).

Potidaea Wallengren, *Kongl. Sv. Vet. Ak. Handl.* (2). v. 4. p. 17 (1865) (type: *hylas*).

Hemaris, Butler (*non* Dalman, 1816), *Trans. Zool. Soc. Lond.* ix. p. 522 (1877).

♂♀. Genal process large, high. Palpus pointed, terminal surface triangular. Eye not lashed. Antenna very strongly clubbed in both sexes, hook abrupt; end-segment long and thin, little wider at base than at tip, with long scales on back and long bristles near and at end. Mesum of mid- and hindcoxa produced into a tooth-like projection (Pl. LXIII. f, 2). Metanotum and abdomen broad; first

segment of the latter almost on a level with metanotum ; spines of abdomen as in *Macroglossum*, strong, flat, those of first row broader than long ; seventh (♀) or eighth (♂) segment with an expansible fan-tail ; sternite of seventh segment truncate, armed with spines at apical edge like the tergites, but the distal spines longer (Pl. LXIII. f. 5). External row of spines of foretarsus reduced to hairs on first segment, the spines of second row sometimes at right angles to the segment ; hindtarsus somewhat compressed, with or without additional spines on the outer surface of the first segment. SC^3 and SC^4 of forewing anastomosed at apex of wing ; cell of hindwing very short ; SC^2 and R^1, and R^3 and M^1 stalked.

♂. Sexual armature more or less asymmetrical. Tenth tergite (Pl. XLIII. f. 6—18) divided, the right half (left in figures) often reduced ; sternite lanceolate, or deeply divided into two broad lobes, more or less twisted, often removed towards the right side, or without lobes. Clasper without friction-scales ; large, right and left generally very different ; harpe vestigial, without process, practically absent. Penis-sheath thin, ending in a slender point (Pl. LI. f. 22—25 ; Pl. LII. f. 1—3), mostly armed with two teeth pointing basad.

♀. Eighth to tenth abdominal segments much smaller in width than the preceding segments, there being a deep cavity all round between the seventh and eighth segments. Seventh tergite incrassate beneath laterally. Eighth tergite a narrow and transversely long halfmoon. Vaginal plate chitinous, connected with seventh sternite by a plate of chitin ; orifice small, proximal, a little removed towards the left side.

Larva not, or little, tapering in front ; head larger than in *Macroglossum* ; horn very long in first stages ; a dorso-lateral line from head to horn. Colour green or brown, sometimes almost black ; pronotum rather broad and generally different in colour from following segments, rough with granules like anal segment ; no white dots.—Food-plants : *Gardenia* ; *Kraussia*.

Pupa : tongue-case compressed, carinate.

Hab. Aethiopian and Oriental Regions, northward to Japan.

Twelve species.

We have met with asymmetrical development of the male genital armature in several instances among the *Sesiinae*. The present case is, however, of particular interest, since the degree of asymmetry is different in the species, so that we are enabled to recognise the connection between the highly specialised organs and the normal ones. The asymmetry is found both in the ninth and tenth segments. *C. kingi* is the most normal of the species of which we know the ♂ organs. Here we find the tenth tergite (Pl. XLIII. f. 6) divided by a groove into two processes which are only separate at the very tip, the left process (*l*) being a little longer than the right (*r* ; left in figure) ; the tergite is straight ; the sternite (Pl. XLIII. f. 7) is also nearly quite symmetrical. In *C. picus* (Pl. XLIII. f. 8) the tenth tergite is of the same shape as before, except that the left process is longer than the right, and that the segment is so twisted towards the left side that the sternite becomes visible at the right side. While in these two species the tenth tergite is long, we find a short tergite in *C. janus* (Pl. XLIII. f. 11. 13), the ninth tergite (*IX*) being correspondingly longer ; in the eastern forms of this species the tenth tergite is nearly symmetrical, while it is more distinctly asymmetrical in the western form (from Flores ; Pl. XLIII. f. 13) ; the sternite (Pl. XLIII. f. 12. 14) is obviously asymmetrical, as is also the ninth tergite. The reduction of the left process of the tenth tergite (Pl. XLIII. f. 8, *l*, right in figures) indicated in *picus*

is exaggerated in *C. hylas* and *leucogaster*, where this left process is represented by a short broad piece of chitin lying at the base of the right process (Pl. XLIII. f. 15—18, *l*), which latter is more or less hooked. We must expect to meet with connecting links between the segment as presented in *picus* on the one side and *hylas* and *leucogaster* on the other; as yet no such intermediate stages in the asymmetrical development of the tenth segment are known. The reader will notice that the tergites of *hylas* and *leucogaster* have the appearance of being simple instead of divided; the reduced left side of the tergite is indeed so little prominent in a dorsal aspect (Pl. XLIII. f. 15) that a casual observer might be misled to consider the segment simple as in *Macroglossum*. In *hylas* the process has developed to a strong hook, which is longest in the Indo-Japanese subspecies, shorter in the Aethiopian subspecies. The long lobe of the sternite found in *picus* (Pl. XLIII. f. 8) is absent from *hylas*; this reduction stands probably in connection with the development of the tergite into a formidable hook. In *leucogaster*, on the contrary, the tergite is not very strong, while the lobe of the sternite (Pl. XLIII. f. 9. 10) is very large and curved, surpassing the tergite in length and width. The movement of the sternite towards the right side faintly indicated in *C. kingi* (Pl. XLIII. f. 6) and very obvious in *picus* (Pl. XLIII. f. 8), has gone so far in *leucogaster* that the sternite and tergite are on the same level (Pl. XLIII. f. 9, dorsal aspect; f. 10, ventral aspect).

The asymmetry of the ninth tergite (*IX t*) is slight in *C. kingi* (Pl. XLIII. f. 6) and very obvious in the other species. The lateral flaps of the ninth segment, the claspers, are unequal in all the species. Here again *C. kingi* presents the least asymmetrical structure. In this species the left clasper (right in figure) is elongate, slender, tapering (Pl. LI. f. 25), while the right one is of the same length, but broader. In *leucogaster* (Pl. LII. f. 2) the difference in the two claspers is considerable, as it is also in *picus* (Pl. LII. f. 3). In both species the left clasper has remained simple in outline, while it is sinuate, or to a more or less great extent divided into two lobes in *C. hylas* (Pl. LI. f. 22. 23. 24). This latter development is exaggerated in *apus* (Pl. LII. f. 1), where the upper lobe of the left clasper is very long. For the development of the tenth sternite see also above under *Haemorrhagia*. The penis-funnel (p-f) is mostly symmetrical, but is longer at the right side in *picus* and *kingi*.

The vaginal orifice is removed a little towards the left side, in accordance with the development of the male armature.

Key to the species:

a. Fortibia ending in a prominent thorn . . . . *b*.
Foretibia without an apical thorn . . . . *b*.

b. Distal border of forewing at least 4 mm. wide at R^1 . . . . . 389. *C. kingi*.
Distal border of forewing less than 4 mm. wide at R^1 . . . . . *c*.

c. Body black above . . . . . 397. *C. titan*.
Body not black above; breast white, slightly yellowish . . . . . *d*.
Body not black above; breast yellow . . . *e*.

d. Last abdominal sternites all white, red belt of abdomen marked only at the sides . 396. *C. leucogaster*.

Last abdominal sternites black in middle, red belt complete above	395.	*C. hylas.*
e. Abdomen with broad black and red belt, beneath black, with yellow patches . .	390.	*C. woodfordi.*
Abdomen with blood-red belt, yellow beneath	393.	*C. apus.*
Abdomen without belt		*f.*
f. Border of forewing less than 2 mm. broad before SC^5		*g.*
Border of forewing about 2 mm. broad before SC^5	392.	*C. xanthus.*
g. Abdomen above unicolorous	391.	*C. janus.*
Abdomen above washed with ferruginous behind	394.	*C. trochilus.*
h. Border of forewing nearly 4 mm. wide at SC^5	400.	*C. lifuensis.*
Border of forewing about 1 mm. wide at SC^5.		*i.*
i. Underside of abdomen black with white spots	398.	*C. picus.*
Underside of abdomen ochraceous . . .	399.	*C. armatus.*

389. Cephonodes kingi.

Macroglossum kingi McLeay, in King's *Surv. Austr.* ii. p. 465. n. 167 (1827).
Macroglossa cunninghami, Boisduval (*non* Walker, 1856 ; *non* Schaufuss, 1870), *Spec. Gén. Lép. Hét.* i. p. 375. n. 69 (1875).
Hemaris hylas, Butler (*non* Linné, 1771), *Trans. Zool. Soc. Lond.* ix. p. 522. n. 24 (1877) (partim).
Hemaris kingi, Kirby, *Trans. Zool. Soc. Lond.* ix. p. 233 (1877) (Australia ; = *cunninghami* of Boisd.); Misk., *Proc. Roy. Soc. Queensld.* viii. p. 4. n. 1 (1891) (Brisbane ; Rockbampton ; synon. partim) ; id., *l.c.* p. 60 (1891) (= *bucklandi*).
**Cephonodes bucklandi* Butler, *Ann. Mag. N. H.* (5). xiv. p. 404 (1884) (Pt. Darwin ;—Mus. Brit.) ; Kirby, *Cat. Lep. Het.* i. p. 627. n. 1 (1892).
Hemaris bucklandi, Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 2. n. 5 (1892).
Cephonodes kingi, Kirby, *l.c.* n. 2 (1892).

♂ ♀. Sides of proximal segments, the sixth and seventh segments, and base of tail yellow, fifth and a mesial patch and sixth as well as (mostly) apex of fourth black, without red scales ; underside yellow, palpi whitish, sternite of fourth segment and middle of third black, greater part of tail black ; bases of wings below yellow ; distal marginal band of forewing 4 to 5 mm. broad at SC^5, dentate between veins, or even (with intergradations), in ♀ ♀ mostly less dentate than in ♂ ♂, but there are specimens of both sexes with dentate and with non-dentate edge.

♂. Ninth and tenth segments practically symmetrical, the asymmetry found in other species just indicated ; tenth tergite (Pl. XLIII. f 6. 7) as in *woodfordi*, slightly tapering to end, divided by a mesial groove, apically incised, the left lobe (*l* in figure) a little longer than the *right* ; sternite elongate-lanceolate, apex acuminate, *right* side more convex at base than left. Left clasper long, not always as narrow as in figure, with almost parallel sides, slightly narrowed towards end, apex rounded ; right clasper larger, but also narrow, widest beyond middle, ventral edge shallowly emarginate distally, apex obtusely acuminate, somewhat curved ventrad (Pl. LI. f. 25). Penis-funnel compressed, large, but short, triangular ; penis-sheath rather stout for this genus, without hooks.

Larva beneath with a line at each side, often also with interrupted mesial line ; ground-colour green or black, extent of black very variable.——Green form : a thin

black dorso-lateral line from thorax to horn, interrupted, comb-like on each segment, as black dots are joined to it ; ventro-lateral line developed to large spots on the outer side of the abdominal legs.——Black form : head, pronotum, and anal tergite red ; a dorso-lateral line and an infra-stigmatical one pale, sides pale-spotted.

Hab. Tropical Australia : Queensland and N.W. Australia.

In the Tring Museum 6 larvae, 16 ♂♂, 14 ♀♀ from various places in Queensland, some in January and February (Dodd).

390. Cephonodes woodfordi.

**Cephonodes woodfordi* Butler, *Trans. Ent. Soc. Lond.* p. 389. t. 12. f. 1 (1889) (Guadalcanar ;— Mus. Tring).

♂♀. A larger species than *hylas*; abdomen above with red band on segment 5; underside of palpus and breast, legs (except hindtarsus) and base of wings yellow, a mesial series of patches on abdomen, decreasing in size behind, and small lateral spots on the proximal segments paler yellow, while a rather large triangular lateral spot on sternites 5 and 6 and a larger mesial patch on 7 are like breast : border of forewing about 1 mm. wide behind SC^5.

♂. Tenth tergite slightly asymmetrical, as is also the ninth ; elongate, tapering apicad, divided by a mesial groove, the two halves only separate at extreme end, the left slightly longer than the right; sternite produced into a long, lanceolate lobe, which is asymmetrical and removed towards the left side, but not so much as in *C. leucogaster*, the segment resembling that of *C. picus*. Claspers nearly as in *C. picus* ; left one long, narrow, slightly curved, truncate ; right one large, very broadly sole-shaped, inner surface clothed with black hairs, no distinct mesial fold. Penis-funnel long, compressed.

Hab. Solomon Islands and Louisiade Archipelago.

Two subspecies :

a. C. woodfordi woodfordi.

Cephonodes woodfordi Butler, *l.c.* ; Kirby, *Cat. Lep. Het.* i. p. 627. n. 3 (1892).

♂♀. Tail black, some of the upper hair-scales yellowish, and (in ♂) a basal patch on underside yellow, in ♀ hairs and scales on anal segment also yellow.

Hab. Solomon Islands.

In the Tring Museum 2 ♂♂, 13 ♀♀ from : Guadalcanar (Woodford ; *type*) ; Guadalcanar, iv. (Meek) ; Isabel, 4. vi. to 9. vii. 1901 (A. S. Meek and Eichhorn).

b. C. woodfordi luisae subsp. nov.

♀. Tail clayish ochraceous, black only at base, breast deeper yellow than in the specimens from the Solomons, side-spots of posterior abdominal sternites tawny for the greater part, middle sternites with red scales at the sides.

Hab. Sudest I., Louisiade Archipelago, February 1898 (A. S. Meek).

1 ♀ in the Tring Museum.

391. Cephonodes janus.

Macroglossa cunninghami, Schaufuss (*non* Walker, 1856), *Nunq. Otios.* i. p. 22 (1870) (Australia).
Cephonodes janus Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 6. n. 3 (1891) (Brisbane ; Rockhampton)

♂♀. Body above unicolorous, green in fresh specimens, yellowish in faded ones ; palpus below almost white ; breast buff-yellow, abdomen ochraceous, both

paler in middle ; tail with side-tufts black at base and orange at tip. Foretibia without apical thorn.

♂. Ninth and tenth tergite not strongly asymmetrical (Pl. XLIII. f. 11. 13), tenth tergite short, mesially divided by a groove, apically separated into two lobes ; sternite (Pl. XLIII. f. 12) produced into two processes of unequal length. Right clasper as in *picus*, but apex more evenly rounded ; left one much narrower than in *picus*, its dorsal edge evenly concave, ventral edge evenly convex, apex rounded.

Hab. Papuan Subregion : Flores to New Caledonia.

Three subspecies :

a. C. janus austrosundanus subsp. nov.

♂. Apical border of forewing narrower than in *janus janus*. Tenth tergite (Pl. XLIII. f. 13) narrowing apicad, the two lobes acuminate, the sinus separating them triangular, small ; sternite (Pl. XLIII. f. 14) with the processes short, that of left side much shorter than the right one, both tapering apicad, with apex rounded.

Hab. Flores.

One ♂ in the Tring Museum from South Flores, Nov. 1895 (A. Everett).

b. C. janus janus.

Macroglossa cunninghami, Schaufuss (*non* Walker, 1856), *l.c.*

Hemaris janus Miskin, *l.c.*

Cephonodes janus, Kirby, *Cat. Lep. Het.* i. p. 628. n. 11 (1892) (partim).

**Cephanodes* (!) *unicolor* Rothschild, Nov. Zool. iii. p. 231. n. 2 (1896) (Duaringa ;—Mus. Tring).

♂ ♀. Border of forewing about 1½ mm. broad at SC^5.

♂. Tenth tergite (Pl. XLIII. f. 11) with almost parallel sides, apical sinus broad, the tips of both lobes somewhat curved inwards, acuminate, right lobe a little longer than the left one ; sternite (Pl. XLIII. f. 12) with both processes lanceolate, the left-side one longer than the right one.

Hab. Australia : Queensland.

In the Tring Museum 5 ♂♂, 3 ♀♀.

c. C. janus simplex.

**Cephanodes* (!) *simplex* Rothschild, Nov. Zool. i. p. 66. t. 5. f. 1 (1894) (Lifu ;—Mus. Tring).

♂. Border of forewing less than 1 mm. broad at SC^5 ; abdomen behind deeper in tint than in front. Sexual armature of ♂ as in *janus janus*.

Hab. Lifu, Loyalty Is.

One ♂ in the Tring Museum.

392. **Cephonodes xanthus** spec. nov. (Pl. V. f. 17, ♀).

♀. Body above unicolorous, rather deeper in tint behind, resembling that of *trochilus*, underside orange, palpus the same, black side-line in front of, and white line round eye prominent ; tail black, only dorso-lateral hair-scales yellow. Distal border of forewing more than 3 mm. wide at SC^5.

Hab. Okinawa, Loo Choo Islands.

In the Tring Museum 1 ♀ collected by Dr. A. Fritze, 26. viii. 1891, on Okinawa.

Resembles *trochilus* and *janus* in the abdomen being without a red belt, but differs remarkably from both in the broad apical border to the forewing and the black tail. It is distinguished from *armatus*, moreover, by the absence of the apical claw of the foretibia.

393. Cephonodes apus.

**Macroglossa apus* Boisduval, *Faune Mad. & Bourb.* p. 79. n. 2. t. 10. f. 4 (1833) (Bourbon ; Mauritius ;—coll. Charles Oberthür) ; id., *Spec. Gén. Lép. Hét.* i. p. 375. n. 68 (1875) ; Vins., *Pap. Bourbon* p. 13 (1891).
Hemaris apus, Saalmüller, *Lep. Madag.* p. 118. n. 268 (1884) (Bourb., Maurit. ; "Madag." ex err.).
Hemaris hylas, Butler, *Trans. Zool. Soc. Lond.* ix p. 522. n. 24 (1877) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 5. n. 2 (1891) (partim).
Cephonodes hylas, Hampson, in Blauf., *Fauna Brit. Ind., Moths* i. p. 120. n. 205 (1892) (partim).

♂ ♀. The green abdomen bears a blood-red belt on the fifth segment, and the following segments are also shaded with blood-red ; tail tawny, side-tuft black at base ; underside of tail, abdomen, and breast pale orange, palpus whitish yellow. Foretibia without apical thorn ; first protarsal segment with a dense row of spines which stand at right angles to the segment.

♂. Ninth and tenth segments as in *C. hylas*, hook of tenth tergite as in *C. hylas virescens*, but shorter. Right clasper similar to that of *hylas*, broader (Pl. LII. f. 1) ; left clasper also of the *hylas*-type, but the upper lobe very much produced, and the lower lobe also longer, the long lobe with bristles, the short one with hairs.

Hab. Bourbon ; Mauritius.

Several specimens in coll. Charles Oberthür, 1 ♂ presented to the Tring Museum.

The tail is too red in Boisduval's figure.

394. Cephonodes trochilus.

**Macroglossum trochilus* Guérin, in Deless., *Voy. Ind. Or.* p. 81 (1843) (Mauritius ;—Mus. Tring).
Macroglossum cyaniris, id., *Ic. Règne Anim.* ii. p. 495 (1844) (Mauritius).
Hemaris cyaniris (?), Kirby, *Trans. Ent. Soc. Lond.* p. 233. 239 (1877) ("Silhet" err. loci).
Macroglossa cyaniris, Waterhouse, *Aid Ident. Ins.* ii. t. 140. f. 1 (1883).
Hemaris cyaniris, Saalmüller, *Lép. Madag.* p. 118. n. 267 (1884) ("India" ex err. ; "Madag." ex err.).
Cephonodes cyaniris, Kirby, *Cat. Lep. Het.* i. p. 628. n. 10 (1892).
Cephonodes janus, id., *l.c.* n. 11 (1892) (sub synon.).

♀. The *type* of this species is in the Tring Museum. It was bought some years ago from a dealer in Paris. The specimen is labelled in Guérin's handwriting "*Macroglossum trochilus* Guer. ic. R. a. (type) Maurice." The specimen in the Dublin Museum mentioned by Kirby, *l.c.*, as *cyaniris*, and figured in Waterhouse, *Aid*, belongs to the present species, not to *janus*. The locality "Silhet" of this specimen is erroneous. *C. trochilus* is similar in structure to *hylas*, in colour to *janus* and *xanthus*. Abdomen without belt, washed with tawny, especially behind, underside of breast and abdomen cadmium-yellow, underside of palpus whitish, of tail yellow, tip of tail tawny-chestnut, side-tuft partly black. Foretibia without thorn at end. Tenth tergite with the apical curved part longer than in *C. hylas virescens*, resembling more that of *C. hylas cunninghami*. Claspers as in *hylas cunninghami*, but the upper lobe of the left clasper narrow, intermediate in shape between those of *hylas virescens* and *hylas cunninghami*.

Hab. Mauritius.

In the Tring Museum 1 ♂ from Mauritius (*type*). In the Museum at Bruxelles 1 ♂ from Mauritius. A third ♂ in the Dublin Museum. Also in the British Museum.

395. Cephonodes hylas.

Sphinx hylas Linné, *Mant. Plant.* p. 539 (1771) (China); Müll., *Naturs., Suppl.* p. 303. n. 50 (1776); Goeze, *Ent. Beytr.* iii. 2. p. 204. n. 5 (1780); Gmel., *Syst. Nat.* i. 5. p. 2387. n. 95 (1790); Donov., *Ins. China* t. 43. f. 2 (1799).

Sesia hylas, Fabricius, *Syst. Ent.* ii. p. 547. n. 2 (1775); id., *Spec. Ins.* ii. p. 154. n. 4 (1781) (partim); id., *Mant. Ins.* ii. p. 99. n. 4 (1787) (partim); id., *Ent. Syst.* iii. 1. p. 379. n. 3 (1793) (partim); Walk., *List Lep. Ins. B. M.* viii. p. 84. n. 9. (1856) (partim).

Cephonodes hylas, Hübner, *Verz. bek. Schm.* p. 131. n. 1402 (1822) (partim).

Macroglossa hylas var., Koch, *Indo-Austr. Lep. Fauna* p. 52 (1865).

Macroglossa hylas, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 376 n. 72 (1875) (partim).

Hemaris hylas, Butler, *Trans. Zool. Soc. Lond.* ix. p. 522. n. 2 (1877) (partim).

♂ ♀. Abdomen with a black and deep red belt, sixth tergite with a black mesial patch, which bears often some red scales; underside of palpus, breast, mesial patches of first abdominal sternites, side-patches of posterior sternite, white, breast often slightly yellowish; tail black, green above (yellowish in faded specimens); rest of underside of abdomen brown-red. Foretibia without apical thorn, but with some short spines like most preceding species (Pl. LXIV. f. 17). Individually variable in colour and size.

♂. Ninth and tenth segments asymmetrical (Pl. XLIII. f. 15—18); tenth tergite twisted, apex pointing towards the right side, the right half alone developed, forming an obtusely pointed hook; left part of tergite reduced to a piece of chitin (*l*), visible in a ventral or a left-side view; sternite without process, represented by a low rounded ridge (*Ve*). Right clasper (Pl. LI. f. 22. 23) large, broadly sole-shaped, ventral edge rounded or angulate in middle; left clasper reduced, broadly sinuate apically, the upper lobe produced, the ventral one broad and short, both lobes clothed at and near the edge with short spines and longer bristles (Pl. LI. f. 22—24). Penis-funnel rather small (P-F), with long bristles.

Larva figured of the African and Indian subspecies.

Hab. Aethiopian Region; India to Japan; Flores to Australia.

Three subspecies, which agree exactly in colour, but differ constantly in the sexual armature of the ♂ ♂.

a. C. hylas virescens.

Macroglossa hylas, Boisduval (*non* Linné, 1771), in Deleg., *Voy. Afr. Austr.* p. 594. p. 95 (1847) (Natal); Mab., *Ann. Soc. Ent. France* p. 299 (1879) (Madag.); Dew., *Mitth. Münch. Ent. Ver.* iii. p. 23 (1879) (Chinchoxo); Oberth., *Ann. Mus. Civ. Genova* xviii. p. 735. n. 86 (1883) (Sboa, vi.); Möschl., *Abh. Zool. Bot. Ges. Wien* xxxiii. p. 288. n. 85 (1884) (Caffraria; = *picus* ex errore!).

Macroglossum apus, Guérin (*non* Boisduval, 1833), in Lefebvre, *Voy. Abyss.* vi. p. 386 (1845) (Abyssinia).

Macroglossa apus, Boisduval, in Deleg., *Voy. Afr. Austr.* p. 594. n. 96 (1847) (Natal).

Potyblica virescens Wallengren, *Kongl. Sv. Vet. Ak. Handl.* (2). v. 4. p. 17 (1865) (Caffraria).

**Macroglossa confinis* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 376. n. 70 (1875) (Senegal; Casamance; Natal; Sierra Leone; Ashanti;—coll. Oberthür).

Hemaris hylas, Butler, *l.c.* (1877) (partim); Saalm., *Lep. Madag.* p. 117. n. 266. t. 3. f. 40 (1884); Druce, in Jameson, *Story Rear Col.* p. 446 (1887) (Aruwimi, iii.); id., in Moloney, *W. Afr. Forestry* p. 492. n. 1 (1887); Möschl., *Abh. Senk. Naturf. Ges.* xv. p. 67. n. 147 (1890) (Gold Coast); Dist., *Nat. Transvaal* p. 236 (1892) (Zoutpansberg, v.).

Cephonodes hylas, Butler, *Proc. Zool. Soc. Lond.* p. 674. n. 155 (1893) (Zomba, i.); id., *l.c.* p. 843. n. 121 (1896) (Nyassald., ii. iii.); Hamps., *l.c.* (1892) (partim); Joann., *Ann. Soc. Ent. France* p. 430. n. 20 (1894) (Mahé, Seychelles); Fawc., *Trans. Zool. Soc. Lond.* xv. p. 312. n. 16. t. 48. f. 13—18 (*l.*). 19 (*p.*) (1901).

Sesia hylas, Westwood, in Oates, *Matabeleld.* p. 355 (1881).

Cephonodes virescens, Kirby, *l.c.* n. 6 (1892).

Cephonodes confinis, id. *l.c.* p. 628. n. 8 (1892).

♂. Hook of tenth tergite short (Pl. XLIII. f. 15, 16). Right clasper strongly angulated ventrally in middle; left clasper ending in a narrow, club-shaped, dorsal lobe, ventral lobe somewhat produced distad, with long bristles lying upon the inner surface of the clasper (Pl. LI. f. 23). Penis-sheath generally without subapical teeth.

Larva: various forms and stages figured by Fawcett, *l.c.*

Hab. Africa, south of the Sahara; Madagascar.

In the Tring Museum several larvae, and 200-odd specimens from various places in West, South, and East Africa; Madagascar.

b. C. hylas hylas.

Sphinx hylas Linné, *l.c.* (China); Donov., *l.c.*

Sesia hylas, Fabricius, *l.l.c.c.*; Walk., *l.c.* (partim).

Cephonodes hylas, Hübner, *l.c.*; Butl., *l.c.* t. 90. f. 4. 5 (*l., p.*) (1877) (partim); Moore, *Lep. Ceylon* ii. p. 31. t. 93. f. 4a (1882) (partim); Swinh., *Proc. Zool. Soc. Lond.* p. 287. n. 1 (1885) (Poona, xi. ii. iii.; Satara vi.; Belgaum; Bombay, vii.; partim?); Warr, *Proc. Zool. Soc. Lond.* p. 294. n. 7 (1888) (Campbelpore, vi.; Abdol, vii.); Leech, *ibid.* p. 581. n. 1 (1888) (Satsuma, v.; Nagasaki, v. vi.); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 120. n. 205. f. 69 (♂) (1892) (partim; synon. includ. 4 other species); Kirby, *Cat. Lep. Het.* i. p. 627. n. 7 (1892) (partim); Leech, *Trans. Zool. Soc. Lond.* p. 296. n. 90 (1898) (partim; Japan; W. China).

Macroglossa hylas, Boisduval, *l.c.* (partim).

Hemaris hylas, Moore, *Journ. As. Soc. Beng.* liii. 2. p. 234. n. 6 (1884) (Cachar); Swinh., *Trans. Ent. Soc. Lond.* p. 162. n. 1 (1890) (Moulmein).

Cephonodes (!) *hylas*, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 419. n. 205 (1898) (Sikhim; Bhutan; vii. viii.).

♂♀. Tenth tergite (Pl. XLIII. f. 17) more curved than in *virescens*, dilated dorsally before end, hook long. Right clasper larger than in preceding, ventral margin less angulate; left clasper with dorsal lobe broad, not dilated at end, ventral lobe less projecting, no long spines upon inner surface (Pl. LI. f. 22).

Green form of larva figured by Butler, *l.c.*

Hab. From Ceylon northward to China and Japan.

In the Tring Museum 2 pupae, 50-odd specimens from: Japan; Loo Choo Is.; Formosa; Tonkin; Siam; Khasia Hills; Sikhim; Calcutta; Kulu.

c. C. hylas cunninghami.

Sesia hylas, Walker, *l.c.* viii. p. 84. n. 9 (1856) (partim; Moreton B.).

**Sesia cunninghami* id., *l.c.* p. 85. n. 10 (1856) (Australia;—Mus. Brit.).

Hemaris hylas, Butler, *Trans. Zool. Soc. Lond.* ix. p. 522. n. 24 (1877) (partim); Misk., *Proc. Roy. Soc. Queensld.* viii. p. 5. n. 2 (1891) (partim).

Cephonodes picus, Kirby, *Cat. Lep. Het.* i. p. 628. n. 9 (1892) (partim).

♂. Tenth tergite (Pl. XLIII. f. 18) slenderer than in Indo-Japanese *hylas*, hook longer than in *virescens*. Claspers as in *hylas hylas*, but the left one has the ventral lobe much more strongly rounded (Pl. LI. f. 24).

Hab. Flores to Queensland.

In the Tring Museum 20-odd specimens from: S. Flores, x. '96 (Everett); Dili, Timor, v. (Doherty); Pt. Darwin; Queensland.

The individuals of *Cephonodes* recorded as *hylas* from the larger Sunda Islands belong to *picus*; no individual of *hylas* has so far been found, to our knowledge, in the Malayan District proper. This is certainly very remarkable, as the insect is common in North Australia, India, China, Japan, and Africa. See *Celerio lineata*.

396. **Cephonodes leucogaster** spec. nov.

♂. Similar in colour to *hylas*; characterised as follows:

Red band on fifth tergite of abdomen narrow, mesially more or less interrupted; last two sternites completely creamy white, or at least with white mesial spots besides the large side-patches; middle of tail beneath clayish buff. Apical border of forewing a little narrower.

♂. Sexual armature widely different from that of *hylas*: ninth and tenth segments (Pl. XLIII. f. 9, dorsal view; f. 10, ventral view) quite asymmetrical, the tenth sternite not lying beneath the tergite but at the right side; tenth tergite separated into two halves, the left lobe reduced to a small piece of chitin, lying close against the right lobe, and visible only in a ventral or a left-side view; the right lobe (*Xt*) compressed, elongate, curved downward at end, pointed; tenth sternite (*Xr*) longer than the tergite, longitudinally concave on its true upper surface, the right-side edge not quite so high as the left-side edge, apex curved towards the tergite. Right clasper (Pl. LII. f. 2) broadly sole-shaped, ventral margin strongly convex before middle, rounded-angulate, apical part of dorsal margin curved inwards, clothed with long bristles; a tuft of long bristle-like scales at apex of clasper; left-side clasper much smaller, ventral margin concave from base to beyond middle, dorsal margin convex, apex acuminate, clothed at edge with peculiar thickened long black scales which are widened at end. Penis-funnel (Pl. LII. f. 2, p-f) as in *hylas*.

Hab. Madagascar.

In the Tring Museum 3 ♂♂ from: Antanambé, Baie d'Antongil, March, April, 1897 (Mocquerys; *type*); and "Madagascar."

397. **Cephonodes titan.**

**Cephanodes* (!) *titan* Rothschild, Nov. Zool. vi. p. 69. n. 6 (1899) (Amboina;—Mus. Tring).

♂. The largest species of the genus. Body and base of wings above, and, besides, under surface of abdomen black; tail tawny-orange below; breast orange, palpi clayish buff.

Hab. Amboina.

One ♀ in the Tring Museum; not seen in other collections.

This is the only specimen of *Cephonodes* known from the Moluccas.

398. **Cephonodes picus.**

Sphinx picus Cramer, *Pap. Exot.* ii. p. 38. t. 148. f. B. (1777) (Coromandel).

Sesia hylas, Fabricius (*non* Linné, 1771), *Spec. Ins.* ii. p. 154. n. 4 (1781) (partim); id., *Mant. Ins.* ii. p. 99. n. 4 (1787) (partim); id., *Ent. Syst.* iii. 1. p. 379. n. 3 (1793) (partim); Walk., *List Lep. Ins. B. M.* viii. p. 84. n. 9 (1856) (partim); Moore, *Proc. Zool. Soc. Lond.* p. 794 (1865) (Balasore); Semp., *Verh. Zool. Bot. Ges. Wien* xvii. p. 700. n. 16 (1867) (larva; Luzon).

Sphinx hylas, Gmelin, *Syst. Nat.* i. 5. p. 2387. n. 95 (1790) (partim).

Cephonodes hylas, Hübner, *Verz. bek. Schm.* p. 131. n. 1402 (1822); Butl., *Trans. Zool. Soc. Lond.* ix. p. 522. n. 2 (1877) (partim; synon. incl. four other species); id., *Proc. Zool. Soc. Lond.* p. 613. n. 60 (1881) (Kurrachi, xii.); Swinh., *ibid.* p. 514. n. 9 (1884) (Kurrachi, common in xii.); id., *l.c.* p. 431. n. 1 (1886) (Mhow, ix. xii.); Misk., *Proc. Roy. Soc. Queensld.* viii. p. 5. n. 2 (1891) (partim); Hamps., *Illustr. Typ. Specim. Lep. Het. B. M.* ix. p. 4. n. 68 (1891) (Ceylon; partim); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 2. n. 7 (1892) (partim; synon. including three other species); Kirby, *Cat. Lep. Het.* i. p. 627. n. 7 (1892) (partim); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 120. n. 205 (1892) (partim); Huwe, *Berl. Ent. Zeitschr.* xl. p. 356. n. 1 (1895) (Java), Pagenst., *Jahrb. Nass. Ver. Nat.* xlix. p. 155. n. 114 (1896) (Sumba); Semp., *Schm.*

Philipp. ii. p. 407. n. 61. t. 1. f. 6—9 (*l., p.*) (1896) (Luzon : Camig. de Mindan. ; Mindan. ; v.— x. xii. i.) ; Nurse, *Journ. Bombay N. H. Soc.* xii. p. 513 (1899) (Cutch ; partim ?).

Macroglossum hylas var., Guérin, in Deless., *Voy. Ind. Or.* p. 81 (1843) (Nilgiris).

Macroglossa picus, Kollar, in Hüg., *Kaschmir* iv. 2. p. 458. n. 1 (1848).

Macroglossa cunninghami, Koch, *Indo-Austr. Lep. Fauna* p. 52 (1865) (partim ?).

**Macroglossa yunx*, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 376. n. 71 (1875) (Australia ;—coll. Oberthür).

Macroglossa hylas, id., *l.c.* n. 72 (1875) (partim).

Cephonodes hylas var. *cunninghami*, Swinhoe (*non* Walker, 1856), *Proc. Zool. Soc. Lond.* p. 287. n. 2 (1885) (Bombay, Poona).

Hemaris hylas, id., *Journ. Bombay N. H. Soc.* iii. p. 119. n. 16 (1888) (Karachi, xii., this species ?).

Cephonodes cunninghami, Hampson, *Illustr. Typ. Specim. Lep. Het. B. M.* viii. p. 1. n. 2 (note) (1891) (Nilgiris, 3000—6000 ft., April).

Cephonodes picus, Kirby, *l.c.* p. 628. n. 9 (1892) (partim).

♂ ♀. There is no constant difference in colour from *C. hylas* ; the belt of the abdomen is very often narrower, being sometimes even absent, and the individuals are generally rather smaller and less robust, which characters, however, do not at all apply to every specimen. *Foretibia ending in a prominent thorn* (Pl. LXIV. f. 16).

♂. Ninth and tenth segments resembling those of *kingi*, but much more asymmetrical, the tenth sternite being moved towards the right side ; tenth tergite (Pl. XLIII. f. 8) divided by a longitudinal groove, the two halves separated only at the tip, elongate, slightly tapering apicad, so twisted that the right lobe lies higher than the left one, the latter is the shorter ; sternite (*Xe*) curved, lanceolate. Right clasper (Pl. LII. f. 3) very large, ventral part of inner surface covered with black hairs ; left clasper narrow, sides nearly parallel, apex somewhat dilated, subtruncate, ventral angle more rounded than upper one. Penis-funnel large.

Larva and pupa figured by Semper, *l.c.*

Hab. Ceylon and South India, eastwards to the Marshall Islands. Not known from North India and China.

In the Tring Museum 34 specimens from : Queensland ; N. Guinea ; Tiandoe Is. ; Kisser ; Sumba ; Christmas I. ; Java ; Penang ; Nilgiris ; Ceylon.

The specimens from Christmas Island are very large.

399. **Cephonodes armatus** spec. nov.

♂ ♀. Similar in colour to *C. janus*, but abdominal segments 5 and 6 with a small red side-spot each, or 5 with a complete belt, and foretibia armed at end with a thorn as in *picus*. Yellow underside of abdomen greyish in middle.

♂. Sexual armature as in *picus*, but the right-side clasper more sharply truncate, with the inner edge less rounded.

Hab. Fiji ; Niuafu ; Samoa ; Mariannes.

Easily distinguished from *picus* by the underside of the abdomen and of the tail being yellow.

Two subspecies, which may turn out to be distinct from one another.

a. C. armatus armatus.

Hemaris cynniris, Druce (*non* Guérin, 1844), *Proc. Zool. Soc. Lond.* p. 220. n. 1 (1888) (Fiji).

♂ ♀. Abdomen with two deep red side-spots on segments 5 and 6.

Hab. Fiji (*type*) ; Niuafu ; Samoa.

In the Tring Museum, one ♂ from Suva, Viti Levu, and one ♀ from Apia, Upolu (Woodford).

In coll. Charles Oberthür 1 ♂ from Vatu Lele, Fiji, ex Mus. Godeffroy. In the Berlin Museum one ♀ from Niuafu (September; Friedländer).

In coll. Druce a series from Suva, Viti Levu (Woodford).

b. C. armatus marianna subsp. nov.

♀. Abdomen with a ferruginous belt upon segment 5, becoming ochraceous at the sides, a ferruginous mesial spot and a smaller and paler side-spot on segment 6.

Hab. Mariannes.

One ♀ in the Paris Museum from Rota, Mariannes (M. A. Marche).

400. **Cephonodes lifuensis** (Pl. IX. f. 9, ♀).

**Cephanodes* (!) *lifuensis* Rothschild, Nov. Zool. i. p. 66 (1894) (Lifu;—Mus. Tring).

♀. Abdomen with red band on segment 5 and a red side-spot on 6; tail black at base, side-tufts orange at end or almost wholly tawny; abdomen below cinnamon-rufous, greyish in middle of first sternites. Distal border of forewing broad, somewhat narrower than in *kingi*, gradually narrowing behind, 1½ mm. broad at R^3. Foretibia ending in a thorn as in *picus*.

Hab. Lifu, Loyalty Islands.

In the Tring Museum 2 ♀♀ from Lifu. Not seen in other collections.

CXI. SATASPES.—Typus: *infernalis*.

Sesia, Westwood (*non* Fabricius, 1775), *Cab. Or. Ent.* p. 60 (1848).
Macroglossa, Walker (*non* Ochsenheimer, 1816), *List Lep. Ins. B. M.* viii. p. 95 (1856).
Sataspes Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 261 (1857) (typus: *infernalis*).
Myodezia Boisduval, *Spec. Gén. Lép. Hét.* i. p. 377 (1875) (= *Sataspes*).

♂♀. Closely allied to *Haemorrhagia*; differs especially in the following points: Antennae shorter, not clubbed in ♂, more strongly compressed, deeply grooved; in ♀ slightly clubbed; end-segment distinctly widened at base; penultimate segment of the same shape as the preceding one. Spines of abdomen as in *Haemorrhagia*, except that those of the proximal rows are all longer than broad. Spurs shorter, those of midtibia less unequal. Cell of hindwing more than twice as long as broad.

♂. Tenth tergite divided into two diverging processes (Pl. XLIII. f. 27, 28); sternite vestigial, without lobe. Clasper reduced and distorted (Pl. LII. f. 6); dorsal margin dilated into a broad plate (*a*), which lies upon the inner surface of the clasper, and is continuous with a dorso-apical process (*pdd*) into which the clasper is produced; a ventral process (*pdc*) represents the distal part of the large harpe; this process is armed at the upper corner with a prominent tooth (*d*). Penis-sheath without armature, flattened distally, rather stouter than in *Haemorrhagia*, short, not produced into a thin apical process; a slight transverse thickening ventrally in middle.

Early stages not known.

Hab. Indo-Malayan Subregion: South India, China, eastwards to the Philippines, Celebes, and Java.

Three species.

Key to the species :

a. ♂ : posterior abdominal sternites primrose-yellow ; ♀ : thorax not yellow . . . . . *b*.
♂ : posterior abdominal sternites yellow only at sides ; ♀ : thorax yellow . . . 401. *S. infernalis*.
b. Abdominal tergite 6 with a transverse yellow band . . . . . 403. *S. ribbei*.
Abdomen with a number of yellow patches, or without yellow scaling . . . . 402. *S. tagalica*.

401. Sataspes infernalis.

**Sesia infernalis* Westwood, *Cab. Or. Ent.* p. 61. t. 30. f. 3 (1848) (Silhet ;—Mus. Oxford).
Macroglossa infernalis, Walker, *List Lep. Ins. B. M.* viii. p. 95. n. 19 (1856).
Sataspes infernalis, Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 261. n. 597 (1857).

♂ ♀. Thorax yellow above in both sexes, except a black, ill-defined, transverse band anteriorly on mesonotum ; sometimes the centre of thorax more or less black. The yellow band of abdomen occasionally reduced, seldom altogether absent. The specimen figured by Boisduval as *infernalis* is what Butler named *uniformis*. There occur individuals in which the yellow scaling is vestigial, others in which it is more apparent ; a Sikhim specimen in the Tring Museum has yellow hair-scales on the upperside of several segments, and the posterior side-tufts are also tipped with yellow, but there is no band. All these individuals agree in the structure of the sexual armature, and are doubtless individual forms of the same species. An example from Borneo in the Paris Museum differs remarkably in the bases of the wings being white below, and in other characters; it represents perhaps a subspecies. For convenience we treat the three principal types of colour as individual forms.

♂. Tenth tergite (Pl. XLIII. f. 28) with the lobes compressed, pointed, slightly curved downwards, somewhat sabre-shaped, upper edge rough with notches near middle. Lobe of harpe truncate (Pl. LII. f. 6, *pdc*), the ventral edge acuminate, tooth *d* pointed, plate *a* large.

Hab. Indo-Malayan Subregion.

Three forms :

a'. S. infernalis f. *infernalis*.

**Sesia infernalis* Westwood, *l.c.*
Macroglossa infernalis, Walker, *l.c.*
Sataspes infernalis, Moore, *l.c.* ; id., *Proc. Zool. Soc. Lond.* p. 794 (1865) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 378. n. 1 (1875) (partim) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 517. n. 1 (1877) ; Cot & Swinh., *Cat. Moths Ind.* i. p. 1. n. 1 (1887) (Sibsagar ; Buxa ; Silhet) ; Leech, *Trans. Ent. Soc. Lond.* p. 121. n. 106 (1889) (Kiukiang) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 1. n. 1 (1892) ; Kirby, *Cat. Lep. Het* i. p. 633. n. 1 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 121. n. 206. f. 70 (♂) (1892) (partim) ; Leech, *l.c.* p. 294. n. 64 (1898) (China, June, July ; = *xylocoparis*) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 419. n. 206 (1898) (Sikhim, Bhutan, up to 4000 ft., March).
**Sataspes xylocoparis* Butler, *Proc. Zool. Soc. Lond.* p. 239. n. 1. t. 36. f. 1 (1875) (Shanghai ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 518. n. 4 (1877) ; Kirby, *l.c.* p. 633. n. 5 (1892).

♂ ♀. Abdomen with a more or less broad yellow band on sixth and seventh tergites : the other tergites generally with dispersed yellow hair-scales ; disc of wings violet-purple, with little gloss.

Hab. North India ; Burma ; China.

In the Tring Museum 35 ♂♂, 3 ♀♀ from: Mupin, vi.; Chia-Ting-Fu, W. China, vii.; Bhutan; Sikhim; Khasia Hills.

b.' S. infernalis f. *uniformis.*

**Sataspes infernalis*, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 378. n. 1. t. 10. f. 1. 2 (1875) (partim); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 121. n. 206 (1892) (partim).

**Sataspes uniformis* Butler, *Proc. Zool. Soc. Lond.* p. 3. n. 1 (1875) (Silhet;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 518. n. 2 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 1. n. 2 (1877); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 1. n. 2 (1892) (Silhet).

♂. Abdomen with few or no yellow scales; otherwise like the preceding.

Hab. South and North India; probably everywhere within the range of *infernalis*.

The disc of the wings is too strongly glossy in Boisduval's figures.

In the Tring Museum 1 ♂ from Sikhim.

c.' S. infernalis f. *glossatrix* nov.

Sataspes infernalis Boisduval, *l.c.* (partim; Java, ♀).

♂♀. Abdomen without yellow scales; disc of wings metallic bluish green; base of wings below white; lobes of tenth tergite longer than in Indian and Chinese individuals.

Length of forewing: ♂, 31 mm.

Hab. Sebauwang R., Borneo, January 1890.

One specimen (*type*) in the Paris Museum; Java (Boisduval).

402. Sataspes tagalica.

**Sataspes tagalica* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 378. n. 2. t. 10. f. 3. 4 (1875) (Burias, Philippines;—coll. Charles Oberthür).

♂. Posterior abdominal sternites pale primrose yellow. Tenth tergite (Pl. XLIII. f. 27) with the lobes spatulate, apex somewhat twisted, feebly truncate, inner angle slightly acuminate, a sharp tooth at upper edge of lobe. Clasper as in *infernalis*, but tooth *d* broader, lobe *pdc* more rounded, plate *a* smaller. Fore- and hindwing with yellow basal costal tuft beneath; base of hindwing with some white scaling.

♀. Thorax without yellow scaling, abdomen below with the yellow area of ♂ vestigial, or the abdomen entirely without yellow scales.

We unite here a number of different-looking insects as forms of one species. They agree in structure, as far as we have been able to study them. The material is scanty in collections, but what we have seen confirms us in the belief that we have to do with one variable species instead of five. We are the more convinced of the correctness of this view, as individual variability in the amount of yellow is illustrated also by *S. infernalis*.

Hab. Indo-Malayan Subregion.

Five forms, characterised as follows:

a.' S. tagalica f. *tagalica.*

**Sataspes tagalica* Boisduval, *l.c.*; Semp., *Schm. Philipp.* ii. p. 408. n. 63 (1896) ("not received").

**Sataspes ventralis* Butler, *Proc. Zool. Soc. Lond.* p. 3. n. 2 (1875) (Hongkong; Silhet; Mus. Brit.): id., *Trans. Zool. Soc. Lond.* ix. p. 518. n. 3 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 1. n. 3 (1887); Kirby, *Cat. Lep. Het.* i. p. 633. n. 4 (1892) (Hongkong; Silhet); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 122. n. 207 (1892) (Sikhim; Silhet; Burma; Hongkong); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 419. n. 207 (1898) ("not seen").

Boisduval's name has priority over that of Butler. The type of *tagalica* in Charles Oberthür's collection is in rather poor condition. The white stripe near the costal margin of the hindwing above is present (as a matter of course, we might say) as in the other forms, though Boisduval expressly states that this is not the case ; perhaps he never raised the forewing, which covers the stripe.

♂. Disc of forewing and almost the entire hindwing green ; thorax yellow above, black in middle ; abdomen with pale yellow dorsal patches.

♀. Like ♂, but abdominal sternites with traces only of the primrose-yellow area, and the dorsal patches rather less extended.

Hab. North India ; Hongkong ; Philippines.

In the Tring Museum 1 ♂, 2 ♀♀ from Hongkong.

b.' S. tagalica f. *thoracica* nov.

♂. Thorax yellow : upperside of abdomen without yellow scales ; disc of wings blue.

♀. Not known.

Hab. North India.

In the Tring Museum 2 ♂♂ from : Khasia Hills, April 1894 (*type*).

c.' S. tagalica f. *collaris* nov.

♂. Thorax only with a thin yellow transverse band on pronotum ; abdomen without any yellow scales above ; disc of wings blue.

♀. Not known.

Hab. Burma.

In the Tring Museum 1 ♂ from Burma ; also in coll. Staudinger.

d.' S. tagalica f. *hauxwelli.*

Sataspes hauxwelli Nieéville, *Journ. Bombay N. H. Soc.* xiii. p. 173. n. 20. t. E E. f. 22 (1900) (Tounghoo).

♀. Abdomen without any yellow scales ; disc of wings green, hindwing almost entirely green, as in *tagalica* f. *tagalica* ; pronotum without yellow band, or only with a very few yellow scales.

Hab. Burma.

In the Tring Museum 1 ♀ from Burma.

e.' S. tagalica f. *cerberus.*

**Satapas cerberus* Semper, *Schm. Philipp.* ii p. 408. n. 62 (1896) (N. W. Luzon, v.).

♀. No yellow scales on thorax and abdomen, except a very few in middle of protonotum ; disc of wings blue ; base of hindwing beneath a little more extended yellow than in the other forms.

Hab. Philippines : Luzon, 1 ♀ in coll. Semper.

403. Sataspes ribbei.

Sataspes ribbei Röber, *Iris* i. p. 29. t. 1. f. 5 (♂) (1885) (Celebes) ; Kirby, *Cat. Lep. Het.* i. p. 633 n. 2. (1892).

♂. We know this insect only from the description and figure. It has the posterior segments of the abdomen below pale yellow like *tagalica*, but possesses a yellow dorsal band on the sixth tergite, and the wings are said to be blackish brown, the strong gloss of *tagalica* being absent.

Hab. Bonthain, S. Celebes. Where is the type ?

Subfamily **Philampelinae.** Typus : *Pholus satellitia.*

Sphingides Leach, in Brewst., *Edinb. Encycl.* ix. p. 130 (1815) (partim).
Sphingidae Samouelle, *Ent. Compend.* p. 243 (1819) (partim).
Bombyliae Hübner, *Verz. bek. Schm.* p. 131 (1822) (partim).
Eumorphae id., *l.c.* p. 133 (1822) (partim).
Deilephilae id., *l.c.* p. 136 (1822) (partim).
Manducae id., *l.c.* p. 138 (1822) (partim).
Smerinthi id., *l.c.* 141 (1822) (partim).
Sesiidae Stephens, *Illustr. Brit. Ent., Haust.* i. p. 132 (1828) (partim ; type : *Haemorrhagia tityus*).
Macroglossini Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 149 (1865) (partim ; *nom nud.*).
Chaerocampini iid., *l.c.* p. 153 (1865) (partim ; *nom nud.*).
"Smérinthides" Boisduval, *Spec. Gén. Lép. Hét.* i. p. 8 (1875) (partim).
"Euryglottides" id., *l.c.* p. 58 (1875) (partim).
"Déiléphilides" id., *l.c.* p. 158 (1875) (partim).
"Macroglossides" id., *l.c.* p. 289 (1875) (partim).
Macroglossinae Butler, *Trans. Zool. Soc. Lond.* ix. p. 516, 517 (1877) (partim ; includes type of *Sesiinae*).
Chaerocampinae id., *l.c.* p. 516, 544 (1877) (partim ; type : *elpenor*).
Smerinthinae id., *l.c.* p. 516, 582 (1877) (partim).
Sphinginae id., *l.c.* p. 517, 598 (1877) (partim).
Pterogonidae Burmeister, *Descr. Rép. Argent.* v. p. 342 (1878) (partim).
Philampelidae id., *l.c.* p. 345 (1878) (partim).

♂ ♀. Sexual armature symmetrical ; tenth segment (♂) not divided mesially, the tergite narrow ; seventh sternite (♀) membranaceous distally, never spinose. Abdominal spines uniserial only in *Pholus* and *Tinostoma*. No high crest on mesonotum, and second segment of palpus (skeleton) not angulate laterally in any species.

The subfamily falls into two tribes : *Philampelicae*, represented by two genera, which are American (North and South America, Sandwich Is.), and *Nephelicae*, which do not occur in the Neotropical Region, except Northern Mexico.

Tribe **Philampelicae.**—Typus : *Pholus satellitia.*

Philampelidae Burmeister, *l.c.*

♂ ♀. Abdominal spines uniseriate, those of the tergites long, conical. End-segment of antenna long, with dispersed half erect scales all round. Scales at edge of not-scaled area of inner surface of first segment of palpus short and broad, not long and hair-like. Merum of midcoxa not angulate. Friction-scales of clasper numerous and small.

Pupa cylindrical anteriorly, head rounded, tongue-case not compressed.

Larva tapering in front ; horn long in first stages, short later on, replaced by a button-like tubercle in last stage.

Hab. America ; Sandwich Islands.

Two genera :

Second segment of palpus less than twice as long as broad	CXII. *Pholus.*
Second segment of palpus three times as long as broad ; SC^2 and R^1 of hindwing on a long stalk	CXIII. *Tinostoma.*

CXII. PHOLUS.—Typus : *achemon*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1798) (partim).
Enmorpha elegans Hübner, *Samml. Ex. Schm.* t. 167 (1806—?).
Pholus id., *Verz. bek. Schm.* p. 134 (1822) (partim ; type : *crantor* = *achemon*).
Argeus id., *l.c.* p. 134 (1822) (type : *labruscae*).
Daphnis id., *l.c.* p. 134 (1822) (partim ; type : *cacus*).
Dupo id., *l.c.* p. 136 (1822) (type : *vitis*).
Agrius id., *l.c.* p. 140 (1822) (partim ; type : *anchemolus*).
Philampelus Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 286 (1839) (type : *fasciatus*).
Smerinthus, Lepell. & Serv. (*non* Latreille, 1802), in *Enc. Méth.* x. p. 441 (1825).
Choerocampa, Ménétriès (*non* Duponchel, 1835), *Enum. Corp. Anim. Mus. Petr., Lep. Suppl.* ii. p. 92 (1857).

♂ ♀. Genal process large, triangular. Tongue long. Palpus large, rounded in dorsal and in lateral aspect ; not-scaled part of inner surface of first segment large, the scales at the edge of this space mostly short and broad. Eye large, not lashed. Head not crested. Antenna setiform, cylindrical in ♀ ; hook slender, end-segment produced into a long and thin process which is rough with long scales all round. Spines of abdomen conical, very long and strong, in one row, separate, except those on proximal segments, which stand close together and are shorter and weaker. Hinder edge of merum of midcoxa not angulate ; mid- and hindtarsus with comb of moderately prolonged spines.

♂. Scent-organ of forecoxa strongly developed. External row of spines of hindtarsus often reduced, while the number of spines of the second row is enlarged. Tenth tergite simple, long, slender (Pl. XLIV. f. 1—5) ; *no* sternite [Smith, *Trans. Amer. Ent. Soc.* xv. p. 140 (1888) confuses the anal cone with the sternite]. Clasper large ; a patch of obliquely erect small friction-scales, which are not very conspicuous, resembling those of *Pseudosphinx* ; harpe broad at base, produced into an horizontal process which is more or less curved upwards at end, and is sometimes partly covered by a broad compressed lobe (Pl. XLVII. f. 21. 22 ; Pl. XLVIII. f. 1—9). Penis-sheath very slender for such large insects, resembling that of *Haemorrhagia*, obliquely truncate, and the projecting part of the apical edge produced into a process of variable length (Pl. LIV. f. 26. 27. 28).

♀. Seventh sternite large, triangular, rounded at end, not truncate, apex not spinose ; seventh tergite long, reaching far beyond the apex of the sternite, ventral edges distally close together, covering the vaginal region. Eighth tergite more or less sinuate, rather strongly chitinised. Vaginal plate small, membranaceous, except postvaginal part, which is obtusely triangular and much broader than long ; orifice without special armature.

Larva : green or brown, tapering in front, fourth segment swollen ; direction of lateral markings dorso-frontal—ventro-distal ; horn long and ∽-shaped in first stages, red, replaced in last stage by a smooth round tubercle.—Food-plants : *Vitis*, *Ampelopsis*, *Jussieua*.

Pupa glossy ; head-case rounded in lateral aspect, often more convex ventrally than dorsally ; tongue-case not carinate ; abdominal segments punctured nearly all over dorsally and at base ventrally ; cremaster either conical, smooth, curved ventrad, or flattened, triangular, rough.

Hab. Neotropical and Nearctic Regions.

Nineteen species are known, eighteen of which are in the Tring Museum. There exist doubtless more in South and Central America.

The genus *Pholus* is a very sharply defined one. The species have been

distributed by Hübner and others over a number of genera. They agree, however, so closely with one another in structure that it would be quite arbitrary to treat some under one, others under other generic terms. The only species which at first sight has an aberrant look in the imago as well as in the larva state is *labruscae*. It was chiefly the small ocellus on the fourth segment of the larva which induced some authors to consider *labruscae* generically distinct from *Pholus* (= *Philampelus*) and allied to *Deilephila*. The *labruscae* caterpillar is, however, in the first stages even in colour a *Pholus* larva, the brown colour which makes it similar to the larva of *Pergesa elpenor* appearing later. The structure of the imago is essentially the same as in the other *Pholus*. The peculiar colour of the imago is of no generic value, considering the great differences exhibited in this respect by species like *anchemolus*, *adamsi*, *vitis*, *achemon*.

Key to the species :

a. Hindwing, *above*, blue on disc ; abdomen with white stigmatical dots . . 422. *Ph. labruscae*.
Hindwing, *above*, yellow on disc ; abdomen without white stigmatical dots . . . . *b*.
Hindwing, *above*, red, distal margin not red . . *c*.
Hindwing, *above*, greenish buff, or creamy on disc, distal margin not red . . . . *e*.
Hindwing, *above*, with red distal margin . . . *d*.

b. Forewing with conspicuous dark green antemedian band which is very irregular distally, and with an equally irregular large discal patch . . 421. *Ph. capronnieri*.
Antemedian band gradually fading away distally, discal patch indistinct, under surface almost entirely yellow . . 420. *Ph. phorbas*.

c. Brown subapical patch of forewing continued backwards at least to R^3 . . 416. *Ph. typhon*.
Brown subapical patch of forewing not extending beyond R^1 . . . . 415. *Ph. achemon*.

d. Forewing with pale band from base to apex 419. *Ph. fasciatus*.
Forewing without pale band from base to apex . . . . . 413. *Ph. adamsi*.

e. Forewing with sharply marked even distal marginal band . . . . . 418. *Ph. vitis*.
Forewing without even marginal band ; abdomen with a conspicuous black dorso-lateral triangular patch on two of the middle segments . . . 414. *Ph. translineatus*.
Forewing without even marginal band, abdomen without the two pairs of black patches . . . . . *f*.

f. Forewing with a sharply marked pale discal band from costal to inner margin as in *vitis* . . . . . 417. *Ph. strenua*.
Forewing without this band . . . . . *g*.

g. Underside more or less red, at least on disc of forewing or posteriorly on hindwing	. . . . .	. . *h.*
Underside not red	. . . . .	. . *k.*
h. Hindwing red behind, above and below	.	407. *Ph. drucei.*
Hindwing not red behind, above	. .	. . *i.*
i. Patch near hinder angle of forewing extending to pale line M^1, no stigma on fore- and hindwing; harpe ending in a long hook	. . . . .	408. *Ph. neuburgeri.*
Patch on forewing not reaching M^1, a stigma on fore- and hindwing; harpe very little curved upwards at end	.	. . *j.*
j. Subapical patch of forewing, above, truncate at SC^5; fringe of hinder margin conspicuously white; harpe simple at end: first hindtarsal segment of ♂ broad	. . . . .	404. *Ph. anchemolus.*
Subapical patch of forewing continued to R^1, fringe of hinder margin not conspicuously white; harpe notched at end; first hindtarsal segment of ♂ normal	. . . . .	405. *Ph. triangulum.*
k. Forewing with conspicuous double stigma; fringe of hinder margin more or less pinkish; anal area of hindwing above often red	. . . . .	406. *Ph. satellitia.*
Stigma of forewing absent or vestigial	.	. . *l.*
l. Three straight lines in basal fourth of forewing	. . . . .	411. *Ph. obliquus.*
Lines in basal area of forewing irregular	.	. . *m.*
m. Subapical patch of forewing triangular; a russet or greyish shade from base to near end of M^2; harpe with a hook and a broad lobe	. . . . .	412. *Ph. cacus.*
Subapical patch truncate; pale discal shade not extended to base in form of a band; harpe with a simple hook	.	. . *n.*
n. Antemedian patch at inner margin of forewing sharply limited at SM^1	.	409. *Ph. elisa.*
This patch gradually fading away in front, reaching cell and M^1	. . . .	410. *Ph. eissi.*

404. Pholus anchemolus.

Sphinx anchemolus Cramer, *Pap. Exot.* iii. p. 50. t. 224. f. c (1779) (Surinam).
Agrius anchemolus, Hübner, *Verz. bek. Schm.* p. 140. n. 1505 (1822).
Philampelus satellitia var , Burmeister, *Sphing. Bras.* p. 59. n. 2 (*Separ.* p. 3. n. 2) (1856).
Philampelus anchemolus, Walker, *List Lep. Ins. B. M.* viii. p. 178. n. 8 (1856); Lucas, in Sagra, *Hist. Cuba* vii. p. 292 (1856); Boisd., *Spec. Gén. Lép. Hét.* i. p. 195. n. 4 (1875) (Brazil; Guiana); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 348 (1876) (Surinam); Butl., *Trans. Zool. Soc.*

Lond. ix. p. 577. n. 14 (1877) (Rio de Jan.); Burm., *Descr. Rép. Argent.* v. p. 347. n. 2 (1878) (Northern Argent.); id., *l.c. Atlas* p. 36. t. 15. f. 1. 5 (*l*, *p.*) (1878); Maass., *Stett. Ent. Zeit.* xli. p. 59 (1880) (= *satellitia?*); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 14. n. 6 (1881) (Mexico; Chiriqui); Kirby, *Cat. Lep. Het.* i. p. 669. n. 9 (1892); Pet., *Illustr. Zeit. Ent.* iii. t. 1. f. 1 (larva) (1898); Bönningh., *Iris* xii. p. 126. n. 49 (1899) (Rio de Jan.).

♂ ♀. The ♂ is as a rule more russet than the ♀, and has a longer prothorax. Stigma of forewing not deeper olive than the lines, often vestigial, white fringe of hindmargin conspicuous from near base to beyond rhombiform patch. Underside of body and wings more or less brick-red.

♂. Scent-organ of forecoxa very strongly developed. Tibiae broad, especially the posterior ones, the spurs almost disappearing in the scaling; first hindtarsal segment also broad, this and the following segments with very few spines indicating the outer series, second series with numerous spines. Tenth tergite rounded truncate at tip. Clasper long; dorsal margin nearly straight, slightly concave; no patch of bristles on innerside; harpe (Pl. XLVII. f. 21) long, flattened, straight, ending in a short acute hook, which varies a little in length. Penis-sheath with an acute and rather slender process.

Larva with a round white spot on segments 4 to 7, and a large, elongate, oblique white patch on segments 8 to 10 (Burmeister); or (Peters) with a spot on segments 4 and 5, and elongate patches on segments 7 to 10, there being no white spot on segment 6 in Peters's figure.—Food-plant: *Vitis*; *Ampelopsis*.

Hab. Neotropical Region from Mexico to Argentina.

In the Tring Museum 1 pupa, 50-odd specimens from: Mexico; Honduras; Costa Rica; Peru; Venezuela; Trinidad: Bahia; Rio de Janeiro; St. Catharina.

405. **Pholus triangulum** spec. nov. (Pl. LXVI. f. 2, ♂).

Philampelus lycaon (!), Butler (*non* Cramer, 1775), *Trans. Zool. Soc. Lond.* ix. p. 576. n. 12 (1877) (partim).

Philampelus pandorus, Druce (*non* Hübner, 1824 ?), in *Biol. Centr. Amer., Lep. Het.* i. p. 14. n. 4 (1881) (partim).

Philampelus licaon, Kirby, *Cat. Lep. Het.* i. p. 669. n. 5 (1892) (partim); Druce, *l.c. Suppl.* p. 308. n. 4 (1896) (partim).

♂ ♀. Similar to *satellitia*, deeper olive-brown.——Forewing rather more elongate, the distal margin being longer and the inner margin shorter; lines very prominent, of the same or almost the same tint as the antemedian posterior patch; no stigma, or the stigma not deeper in tone than the lines; subapical costal patch larger than in *satellitia*, prolonged beyond SC^5 (as in Hübner's figure of *licaon*), continued as a line down to the oblique brown shade; crenate submarginal line heavy, sometimes the semicircular marginal spaces bordered by it filled in with brown; hinder edge of wing not reddish.——Hindwing with a prominent stigma.

Underside of abdomen, middle of breast, the hindwing except abdominal area, and disc of forewing, vinaceous-rufous, more or less shaded with brown, always more reddish than in *satellitia*.

♂. Sexual armature similar to that of *anchemolus*, not *satellitia*. Tenth tergite not acuminate, rounded-truncate (Pl. XLIV. f. 3). Clasper without patch of bristles on inner surface; dorsal margin concave; harpe (Pl. XLVII. f. 22) long, broad and flat as in *anchemolus*, ending in a short tooth-like hook, which bears beneath a tooth. Penis-sheath very slender; apical process acute, about four times as long as the sheath is broad.

Early stages not known.

Length of forewing : ♂, 50—60 mm. ; ♀, 65 mm.

Hab. Mexico to Bolivia.

In the Tring Museum 40 specimens from : Huatusco (*type*), and Teocelo, Mexico ; Cuzco, Peru, iv. oi (Garlepp) ; Chulumani, Bolivia, 2000 m., xii. 1900, wet season (Simons).

The present species is easily distinguished from *anchemolus* in the ♂ sex by the first segment of the hindtarsus not being broadly scaled ; the ♀♀ require more careful comparison, but the dark outer surface of the foretibia and the less extended white hinder edge of the forewing, as well as the prolonged subapical costal patch of the same wing, will be sufficient to recognise *triangulum*.

406. Pholus satellitia.

Drury, *Illustr. Ex. Ent.* i. t. 29. f. 1 (♀). 2 (♂) (1770) (Jamaica).

Sphinx satellitia Linné, *Mant. Plant.* p. 539 (1771) (Jamaica) ; Drury, *l.c. Index* (1773) ; Fabr., *Syst. Ent.* p. 542. n. 20 (1775) ; Müll., *Naturs., Suppl.* p. 303. n. 51 (1776) ; Goeze, *Ent. Beytr.* iii. 2. p. 205. n. 6 (1780) ; Fabr., *Spec. Ins.* ii. p. 148. n. 36 (1781) : Gmel., *Syst. Nat.* i. 5. p. 2381. n. 74 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 370. n. 42 (1793).

Sphinx licaon Cramer, *Pap. Exot.* i. p. 86. t. 55. f. A (1775) (W. Indies).

Pholus licaon, Hübner, *Verz. bek. Schm.* p. 134. n. 1436 (1822).

Philampolus satellitia, Burmeister, *Sphing. Bras.* p. 59 (1856) (partim) ; Walk., *List Lep. Ins. B. M.* viii. p. 175. n. 3 (1856) (partim) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 157. n. 55 (1865) (Atlantic distr.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 576. n. 13 (1877) (Honduras ; Jamaica).

Philampus lycaon (!), Grote, *Proc. Ent. Soc. Philad.* v. p. 60 (1865) (partim) ; Walk., *List Lep. Ins. B. M.* xxxv. p. 1854 (1866).

♂♀. The insects united here under one species have partly been considered specifically distinct. As these forms are clearly geographical representatives of one another, and differ only in the lighter or deeper shades of the pattern, which is otherwise essentially the same, the differences being, besides, bridged over to a certain extent by intergraduate individuals, we do not see any reason for treating any of the insects as distinct.

Linné's description is based solely on Drury's figures, which are said by Drury to be taken from Jamaica specimens. The figure of the ♂ agrees fairly well with our Jamaica ♂, showing especially the reddish tint peculiar to the Jamaica ♂, while the figure of the ♀ is decidedly incorrect. It is altogether too green, and does not agree at all with Drury's own description, which fits Jamaica examples. The figure, resembling to a certain extent the North American form *pandorus* of *satellitia*, misled Messrs. Grote and Robinson to consider the Nearctic form to be the true *satellitia*.

White spot of palpus and spot behind eye conspicuous. Forewing with black double stigma, deeper in tint than the lines ; hinder edge more or less pinkish. Under surface not red ; but disc of forewing often russet-tawny. First segment of hindtarsus shorter than tibia in ♂, only as long as segments 2 and 3 together ; in ♀ as long as tibia.

♂. Tenth tergite pointed (Pl. XLIV. f. 5). Clasper large, dorsal margin slightly convex ; no patch of bristles on inner surface ; harpe ending in a long, evenly curved hook which varies in length (Pl. XLVIII. f. 2). Penis-sheath stout, process pointed but not slender, about twice as long as the sheath is broad. (Pl. LIV. f. 27).

Larva green, sometimes changing to brown shortly before pupating ; with five or six white side-spots ; fine black dots, especially on fourth segment.—Food-plants : *Vitis* ; *Ampelopsis*.

Head-case of pupa almost regularly rounded in side-view; abdomen rather grossly punctured above; cremaster elongate triangular, somewhat flattened, rough.

Hab. Neotropical and Nearctic Regions.

Five subspecies:

a. Ph. satellitia pandorus.

Dophnis pandorus Hübner, *Samml. Ex. Schm.* ii. t. 374 (1824?).

Philampelus satellitia, Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 299. n. 2 (1839) (=*licaon?*); Fitch, *Rept. Ins. N. Y.* iii. p. 398 (1856); Emm., *Nat. Hist. N. York* p. 219. t. 45. f. 5 (1854); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 154. n. 1 (1859) (partim); Morris, *Cat. Lep. N. Am.* p. 19 (1860); Clem., in Morris. *Syn Lep. N. Am.* p. 176. n. 1 (1862); Harris, ed. Flint, *Ins. Inj. Veg.* p. 315. t. 5. f. 2. (*i.*) (1862); Jaeg., *Life N. Am. Ins.* p. 193 (1864); Lintn., *Proc. Ent. Soc. Philad.* iii. p. 659 (1864) (life hist.); Saund., *Ent.* i. p. 26 (1868) (London, Can.; larva); Riley, *Amer. Ent.* ii. p. 89. f. 58. a. b. c (*l.*). 59 (*i.*) (1870); Grote, *Trans. Amer. Ent. Soc.* iii. p. 185 (1871); Lym., *Canad. Ent.* vi. p. 158 (1874) (Portland, E. vii.); Riley, *Rept. Missouri* ii. p. 76. fig. 52. 53 (1876); Dimm. & Mann, *Psyche* ii. p. 67 (1877) (liter.); Scudd., *ibid.* p. 68 (1877) (larva); Bunk., *Canad. Ent.* ix. p. 120 (1877) (Rochester, N. Y.; larva, vii.); French, *Trans. Dept. Agr. Illin.* xv. p. 165. fig. (1877); Coq., *ibid.* xviii. App. p. 175 fig. (1880); Saund., *Canad. Ent.* xiii. p. 41. f. 4. 5 (1881) (life hist.); id., *Rept. Ent. Soc. Ont.* xii. p. 19. fig. (1882); id., *ibid.* p. 60. fig. (1882); Clarks., *Canad. Ent.* xv. p. 160 (1883) (parasite: *Perilampus*).

Philampelus pandorus, Walker, *List Lep. Ins. B. M.* viii. p. 174. n. 1 (1856) (cit. "*Phil. ampelophaga* Harris" *ex errore*!; partim); Beth., *Canad. Ent* i. p. 11 (1869) (Ontario); Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 76 (1869); Lintn., *Ent. Contr.* i. p. 192 (1872) (N. York, vi.); Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass.; vii.); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 21 (1874); id., *l.c.* ii. p. 226. n. 28 (1875); Boisd., *Spec. Gén. Lép. Hét.* i. p. 197. n. 6 (1875) (N. Am.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 575. n. 9 (1877) (partim); Grote, *l.c.* iii. p. 222. n. 30 (1877) (Mass.; N.Y.; Penn.); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 14. n. 4 (1881) (partim); Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O.); Saund., *ibid.* p. 147 (1882) (larva); id., *Ins. Inj. Fruits* p. 248. n. 133. fig. 258 (*i.*). 259 (*l.*) (1883); Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine, 1 specimen); Grote, *ibid.* xviii. p. 132. n. 38 (1886); Fern., *Sphing. N. Engl.* p. 59. n. 27. t. 3. f. 1. a. b. c (*l.*, *i.*) (1886) (Maine); Grote, *Hawk Moths N. Am.* p. 32 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 144. t. 6. f. 3. 4 (genit.) (1888) (eastwards to the Mississippi basin); Edw., *Bull. U. St. N. Mus.* xxxv. p. 40 (1889) (liter. rel. to metam.); Beutenm., in Riley, *Ins. Life* iii. p. 322 (1891) (N. York, at elect. light); Kirby, *Cat. Lep. Het.* i. p. 669. n. 3 (1892) (cit. "*Phil. ampelophga* Harris" ex. errore!); Beutenm, *Bull. Amer. Mus. N. H.* vii. p. 288. t. 3. f. 5 (1895) (N. York, two broods); Cross, *Ent. News* vii. p. 297 (1896) (N. Hampsh.); Rowl., *ibid.* x. p. 10 (1899) (Missouri; difference in broods).

Philampelus ampelophaga, Walker, *List Lep. Ins. B. M.* viii. p. 174. sub n. 1 (1856) (cit. Harris, ex errore!); Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 76 (1869) (=*pandorus*).

Chaerocampa satellitia, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep. Suppl.* ii. p. 92. n. 1526 (1857).

♂♀. Brighter green than the other forms; the inner marginal area between base and dark olive-green patch almost as deep in tint as the patch itself in most specimens. The dorso-lateral patches of the abdomen are never so dark as in the other subspecies. There is in most specimens a slight pinkish tint near the anal angle of the hindwing.

Hab. Nearctic Region: Canada southward to Georgia, westward to the Mississippi basin.

In the Tring Museum 3 larvae, 1 pupa, 30-odd specimens from: Massachusetts; Iowa; West Virginia; N. Carolina.

b. Ph. satellitia satellitia.

Drury, *l.c.* (Jamaica).

Sphinx satellitia Linné, *l.c.* (1771) (Jamaica).

Philampelus satellitia, Walker, *l.c.* viii. p. 175. n. 3 (1856) (partim; Jamaica); Boisd, *Spec. Gén.*

Lép. Hét. i. p. 196 n. 5 (1875) (Antilles); Butl., *Proc. Zool. Soc. Lond.* p. 483. n 53 (1878) (Jamaica).

Sphinx satellita (!), Drury, ed. Westwood, *Illust. Ex. Ent.* i. f. 29 (1837).

Philampelus lycaon (!), Maassen, *Stett. Ent. Zeit.* xli. p. 59 (1880) (= *satellitia*).

♂♀. The ♂ has a pinkish tone all over, as in Drury's figure, and the ♀ is rather more whitish grey than Continental specimens.

♂. Harpe much shorter than in Continental ♂♂, and the horizontal portion of the hook much thicker.

Hab. Jamaica.

In the Tring Museum 1 ♂, 6 ♀♀.

c. Ph. satellitia licaon.

Sphinx licaon Cramer, *l.c.* (1775) (West Indies).

Philampelus satellitia, Walker, *l.c.* (1856) (partim); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 348 (1876) (Surinam); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 14. n. 5 (1881) (Brit. Hond.; Nicaragua; Chiriqui); Kirby, *Cat. Lep. Het.* i. p. 669. n. 6 (1892); Druce, *l.c. Suppl.* p. 308 (1896) (Mexico; Guatemala; Costa Rica; Panama).

(?) *Philampelus licaon*, Ottolengui, *Ent. News* v. p. 314 (1894) (partim; Louisiana).

♂♀. Individually rather variable, never as green as the Nearctic *pandorus*; the red patch of *analis* occasionally indicated in *licaon* by a few red scales. Length of harpe not constant. The term "West Indies" of Cramer included Surinam.

Hab. Tropical America, exclusive of the West Indies, from Northern Brazil and Bolivia northward to Mexico.

In the Tring Museum 70-odd specimens from: Mexico; Honduras; Costa Rica; Colombia; Ecuador; Peru; Bolivia; Venezuela.

In the Bern Museum from Para (Dr. Goeldi), at the electric light, iii.

d. Ph. satellitia analis subsp. nov. (Pl. X. f. 2, ♂).

Pholus licaon, Hübner (*non* Cramer, 1775), *Sammlung Ex. Schm.* ii. t. 160 (1824?).

Philampelus satellitia, Burmeister, *Sphing. Bras.* p. 59 (1856) (partim; larva and pupa descr.); Walk., *l.c.* viii. p. 175. n. 3 (1856) (partim; Bolivia); Bönningh., *Iris* xii. p. 125. n. 48 (1899) (Rio de Jan.).

Philampelus posticatus, Butler (*non* Grote, 1865), *Trans. Zool. Soc. Lond.* ix. p. 575. n. 7 (1877) (Bolivia; syn. partim); Burm., *Descr. Rép. Argent.* v. p. 349 (1878) (Bolivia); Kirby, *Cat. Lep. Het.* i. p. 669. n. 1 (1892) (Bolivia; syn. partim).

Philampelus lycaon, Burmeister, *Descr. Rép. Argent.* v. p. 348. n. 3 (1878) (Buenos Ayres).

Philampelus posticarius (!), id., *l.c.* (sub syn.).

♂♀. Hindwing with a more or less obvious red patch at anal angle. The larva as described by Burmeister, *l.c.*, agrees with that of the North American *Ph. satellitia pandorus*. Bönninghausen, *l.c.*, refers to Burm., *l.c. Atlas* t. 15. f. 2, as being a representation of the larva of this species; in this he is wrong; he must have made a mistake in his notes, or, perhaps, his *satellitia* is *obliqua*.

Hab. Paraguay; Argentina; Southern Brazil; northward to Espiritu Santo.

In the Tring Museum 9 ♂♂, 5 ♀♀ from: Paraguay (Dr. Bohls, *type*); Curumba, Matto Grosso, i. '99 (Stuart); Tucuman; Buenos Ayres; Montevideo; La Gama, Argentina, i.; Rio de Janeiro.

e. Ph. satellitia posticatus (Pl. X. f. 1, ♂).

Philampelus satellitia, Lucas, in Sagra, *Hist. Cuba* vii. p. 292 (1857); Herr.-Sch., *Corresp. Bl.* p. 147 (1863) (Cuba).

Philampelus lycaon (!), Grote, *Proc. Ent. Soc. Philad.* v. p. 60. n. 84 (1865) (Cuba); id. & Rob., *ibid.* v. p. 157. n. 54 (1865); Grote, *l.c.* vi. p. 329 (1867); Gundl., *Contr. Ent. Cubana* p. 187 (1881).

Philampelus posticatus Grote, *l.c.* v. p. 62 (1865) (Cuba) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 575. n. 7 (1877) (sub syn.) ; Grote, *Canad. Ent.* xviii. p. 132. n. 39 (1886) (W. Ind. ; Florida) ; id., *Hawk Moths N. Am.* p. 32 (1886) ; Kirby, *Cat. Lep. Het.* i. p. 669. n. 1 (1892) (partim).
Philampelus satellitia a. *posticatus* Grote, *Trans. Amer. Ent. Soc.* iii. p. 185 (1871).
Philampelus licaon, Ottolengui, *Ent. News* v. p. 314 (1894) (Florida).

♂♀. Resembling the southern form *analis*, but the postdiscal pale band and the apical and anal pale patches of forewing more silvery-grey ; the series of black submarginal spots of hindwing continued costad by a rather distinct line, the external area being less deep black than in the other races of *satellitia*.

Hab. Cuba ; Bahamas ; Florida. Perhaps to be discovered in Haiti.

In the Tring Museum 2 ♂♂, 3 ♀♀ from : Nassau, Bahamas (Sir G. Carter) ; Cuba. The specimen figured is from Nassau.

407. **Pholus drucei** spec nov. (Pl. II. f. 3, ♂).

♂. Resembling *Ph. satellitia analis*, but deeper olive ; pale dorsal line of abdomen narrower, not narrowed at the base of the segments ; lateral patch of second, and dorso-lateral one of third segment larger and deeper in tint.

Wings, *above*.——Forewing : olive patch at hinder margin triangular, discal lines sharper marked, more oblique to the veins, the discal costal olive shade less distinct, not obviously continued distad before N^1, a tawny shade along M^1, continued basad ; triangular olive patch at inner margin before angle extended costad to M^1.——Hindwing : abdominal margin broadly red ; a black stigma ; a sharply marked line running costad from upper outer corner of square black patch, submarginal black band distinct up to R^2, then fading away in a blackish olive area, which is narrower than in *satellitia* ; between black square patch and submarginal band there are three sharply marked black lines.

Underside as in *Ph. satellitia analis*, but hindwing rosy red from abdominal edge up to cell ; disc slightly shaded with rosy red.

First segment of hindtarsus only as long as the following two segments ; short apical spur more than half the length of the long one.

♂. Tenth tergite narrowed towards apex, but not sharply pointed. Clasper without patch of bristles on inner surface ; dorsal margin straight, slightly concave ; harpe as in *Ph. satellitia licaon*, but obviously less curved, the hook being shorter. Penis-sheath less pointed than in *satellitia*.

♀ and early stages not known.

Length of forewing : ♂, 40 mm.

Hab. Ecuador.

In the Tring Museum 1 ♂ (*type*) from Ecuador.

Also in coll. Druce and the British Museum.

408. **Pholus neuburgeri** spec. nov. (Pl. II. f. 4, ♂).

♂. Markings deeper in tint than in all the other species. Body similar to that of *satellitia* as regards markings, but upperside dark fawn-colour, olive patch of mesothoracic tegula smaller than in *satellitia*, pale dorsal line of abdomen of nearly even width, sharply marked also on the first segments and continued to metanotum, and behind to eighth tergite, here thin, dividing the olive mesial patch into two slender triangles ; lateral patches of abdomen all sharply marked, the anterior ones the largest, black at lower edges. Underside brick red ; palpus, sides of breast and legs more or less dark pinkish fawn ; palpus without white

spot; upperside of mid- and hindtibiae dirty white; external spines of first protarsal segment prolonged as in *achemon*; first hindtarsal segment a little shorter than tibia, longer than segments 2 and 3 together; short apical hindtibial spur about one-third the length of long one, this a little longer than second tarsal segment.

Wings, *upperside*.——Forewing: distal margin not convex, faintly scalloped; a black basal patch at inner margin, separate from the black inner-marginal antemedian patch; this latter reduced in size, triangular; a double line between the two patches, two other lines more widely apart, converging behind, the proximal one confluent with the antemedian patch before reaching inner margin, the other reaching patch at its upper proximal corner; *no* stigma; discal lines forming at costal margin a sharply marked semicircle, proximal discal lines conspicuous, fourth line also so beyond M^1; brown subapical costal patch reduced, indistinctly covered with a postdiscal band which extends from hinder margin frontad, posterior portion of this band corresponding to the double patch of *satellitia*, but being much broader; greyish marginal border dentate, including a dentate submarginal line; a conspicuous buff line from lower angle of cell along M^1 to near distal edge of wing, vein M^2 also buff, except at base and apex.—— Hindwing: stigma represented by a minute vestigial dot; black discal area extended to M^1 and abdominal margin, interspace between it and black submarginal band fawn-colour, with two sharply marked lines; black submarginal area SC^2—M^1 narrower than in *satellitia*, not reaching costal margin, black spots M^1—SM^2 contiguous.

Underside brick red, rather brighter than body.——Basal area of forewing pale drab-brown, blackish behind; a discal line crossing subcostals at fork, brick red in front, blackish behind, followed by traces of a second line; a brown distal border, triangularly dilated behind R^2, here nearly reaching first discal line.—— Hindwing drab-grey at base, three discal lines, second faint, a brown distal border, which is dilated before middle.

♂. Tenth tergite acuminate, not very sharp, the extreme tip being rounded-truncate. Clasper without patch of bristles on inner surface; harpe (Pl. XLVIII. f. 3) of the *satellitia*-type, but the horizontal part of the process broader and more flat, resembling somewhat that of *anchemolus*, hook as in *satellitia*.

Length of forewing: ♂, 48 mm.

Hab. Argentina, probably Tucuman.

One ♂ in Mus. Tring, received from Herr Neuburger, in whose honour the species is named.

409. **Pholus elisa.**

Philampelus elisa Smyth, *Ent. News* xii. p. 106. t. 4 (♀) (1901) (Cuernavaca, Mexico).

♂♀. Similar to small specimens of *Ph. satellitia*. Second and third segments of abdomen with black lateral patch. First segment of hindtarsus in ♂ as long as tibia and as segments 2 to 4 together, while it is much shorter in *satellitia*.—— Forewing, *above*, more grey, *without* stigma; costal semicircle at apex of cell very sharply marked, heavier than the first discal line; apex more produced, the distal margin being in front more concave than in *satellitia*; a black subbasal patch at inner margin separate from the rhombiform submedian patch; the latter obviously produced basad at (SM^1), the border darker than the centre of the patch; inner edge of wing not pinkish.——Hindwing: as in *satellitia*, no discal line from black

patch costad, black distal shadowy band narrower than in *satellitia* and broadly connected with the black patch ; no stigma.

Underside : as in *satellitia*, no red tints, but disc of forewing somewhat russet-ochraceous ; first discal line rather S-shaped. White spot of palpus short.

♂. Tenth tergite sharply pointed, apex curved downwards, almost hooked Clasper without patch of bristles on innerside, dorsal margin concave ; harpe as in *satellitia*, but stonter, the vertical part of the hook less evenly curved and longer, slightly bent basad at tip. Penis-sheath slenderer than in *satellitia*.

Early stages not known.

Hab. Mexico.

In the Tring Museum 1 ♂ from : Guadalajara, Mexico. Not seen in other collections.

Distinguished from *triangulum* by the underside not being red, and the absence of a stigma from the hindwing ; from *eacus* by the hindwing being devoid of the discal line which runs in *eacus* from upper outer angle of the black patch costad ; from *cissi* by the distinct white spot of the palpus, and by the black antemedian patch of the forewing being sharply limited at (SM^1) and posteriorly broader. The species is nearest *cissi*, from which it is, however, distinct.

410. Pholus cissi.

Philampelus cissi Schaufuss, *Nunq. Otios.* i. p. 19 (1870) (Venezuela) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 576. n. 11 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 669. n. 7 (1892) ; Smyth, *Ent. News* xii. p. 109 (1901).

Philampelus rini Kirby, *l.c.* n. 8 (1892) (laps. calami) ; Smyth, *l.c.*

♂♀. We have from the Felder collection a pair of which the ♀ is labelled "Veneznela, Moritz," and bears a number in the same handwriting as the number on the pin of *Xylophanes* (*hortulanus* =) *crotonis*. In the Staudinger collection is a ♂ labelled "Tavar, Venezuela, Moritz, ex coll. Sommer." These specimens are undoubtedly the insect miserably described by Schaufuss from Moritz's material in Kaden's collection.

Similar to *anchemolus* and *obliquus*, from which it is distinct. Upperside of body and forewing more olivaceous-tawny than in the ♀ of *anchemolus*. Palpus, legs, and underside of body clayish drab ; first segment of palpus and pronotum without white spots, or these vestigial ; upperside of tibiae not white. Mesonotum and first and second abdominal tergites grey in middle ; an uninterrupted, broad, greyish middle line along the other segments, the line feebly constricted at the bases of the segments, much less so than in *anchemolus*.

Wings, *upperside*.——Forewing : lines in basal half irregularly undulate as in *anchemolus* ; patch at hinder margin much less intense, triangular ; *no* stigma ; dark triangular marginal patches R^3—M^2 each bordered proximally by a grey angle-shaped spot, the olive-black scaling proximally of these spots extended costad to R^2 as a rather heavy band, and then continued to near subapical patch as a fine line ; instead of this line there is a series of nervular dots in *anchemolus* ; hinder margin with a pale buff fringe, which extends less far distad than the white fringe of *anchemolus* ; the pale space distally of median patch at hinder margin with two rather sharply marked zigzag lines.——Hindwing : basal area pale buff, more buff than in *obliquus*, more extended than in either of the two close allies ; no stigma ; black patch M^2. SM^2 smaller, being less extended basad between M^2 and (SM^1) ; from the upper outer corner of this patch runs a band costad, fading away costally,

the series of olive-black spots near anal angle is continued towards costal margin, these spots forming a submarginal band which is more distinct behind than in front; between this band and the discal one are two lines; the interspaces between these lines and bands grey behind, blackish in front.

Underside buffish clay-colour, paler at base, darker distally; lines on disc as in *anchemolus*, distal marginal area of forewing as in that species, rather broader behind.

♂. Sexual armature of the *satellitia*-type. Tenth tergite narrowed towards end, but not sharply pointed (Pl. XLIV. f. 4). Clasper hairy on inner surface, but there is no patch of bristles; harpe as in *satellitia licaon*, but the hook shorter. Penis-sheath very slender, apical process thin, acutely pointed.

Early stages not known.

Hab. Venezuela; Peru; Bolivia.

In the Tring Museum 4 ♂♂, 2 ♀♀ from: Venezuela; Yungo del Espiritu Santo, Cochabamba, Bolivia (Germain); R. Inambari, S.E. Peru, 6000 ft., Nov. 1901 (Ockenden); Santo Domingo, Carabaya, S.E. Peru, 6000 ft., June 1902 (Ockenden).

In coll. Standinger 3 ♂♂ from Tovar, Venezuela (Moritz); Huayabamba, Peru; Rio Tanampaya, Bolivia.

In coll. Oberthür a long series from Huamba, Peru (Mathan), and Bolivia, many of the ♂♂ with the white spot of the palpus vestigial.

411. **Pholus obliquus** spec. nov. (Pl. LXVI. f. 1, ♂).

(?) *Philampelus* spec. ?, Burmeister, *Descr. Rép. Argent.* v. *Atlas* p. 36. t. 15. f. 2 (*l.*) (1878) (Corcovado).

(?) *Philampelus satellitia*, Bönninghausen (*nec* Linné, 1771), *Iris* xii. p. 125. n. 48 (1899) (partim; larva).

♂♀. Similar to *anchemolus* in appearance; body and wings not red below. Abdomen above without distinct mesial line of pale spots. White spot on first segment of palpus narrower and longer than in *anchemolus*; white line behind eye conspicuous; external surface of foretibia clayish grey.

Wings, *upperside*.——Forewing more glossy grey than in *anchemolus*; three parallel and oblique lines in basal area, the third ending at inner upper corner of rhombiform patch, all three *straight* from costal margin to (SM^1); no stigma; discal lines 1 and 2 distinct between M^1 and (SM^1), the first reaching rhombiform patch at upper outer corner, posterior part of lines 3 and 4 weak, obsolete behind M^1; portions C—R^3 of discal lines more distal at R^3 than in *satellitia*, *anchemolus*, *triangulum*, etc.; oblique shadowy band broad, extended to distal margin, where it is broader than in *anchemolus*; subapical costal patch large; patch near hinder angle broader than in the allied species, rounded triangular, not concave outwardly, extending a little before M^2, but this portion not narrowed to a more or less rounded spot as in most species; hinder area from base to rhombiform patch dark as in *anchemolus*; fringe of hinder margin buffish, less extended than in *anchemolus*.—— Hindwing: broader than in *anchemolus*; pale basi-discal area more yellowish than in the species just mentioned, black outer area far more extended, broadly connected with the square discal posterior patch; anal area greyish, including a single black spot, which is seldom absent, and often traces of others; no stigma.

Underside wood-brown, with a clayish shade; forewing somewhat russet at distal marginal band.

♂. Tenth tergite rounded-truncate; apex longitudinally ribbed (Pl. XLIV. f. 2).

Clasper slender ; dorsal margin slightly concave from base to apex ; no patch of bristles on innerside ; harpe (Pl. XLVIII. f. 5) : basal portion long, process of the *satellitia*-type, but shorter and less curved. Process of penis-sheath short and obtuse. Hindtarsus and hindtibia normally scaled.

Early stages not known.

The larva figured by Burmeister, *l.c.*, is perhaps that of *obliquus*. It is brown, and has a white band on the tenth segment.

Hab. Neotropical Region : Colombia to Bolivia and Sta. Catharina.

In the Tring Museum 3 ♂♂, 9 ♀♀ from : Rio Dagua, Colombia (W. Rosenberg) (*type*, ♂) ; Paramba, Ecuador ; San Augustin, Mapiri R., Bolivia, 3500 ft., ix. '95 (Stuart); Palma Sola, Venezuela; Bahia; Theresopolis, Rio de Janeiro; Sta.Catharina.

In coll. Oberthür a series from Huamba, Peru (M. de Mathan).

Not difficult to recognise by the straight lines in basal area of forewing.

412. **Pholus eacus.**

Sphinx eacus Cramer, *Pap. Exot.* iii. p. 166. t. 285. f. E (1780) (Surinam)!
Daphnis megaeacus, Hübner, *Verz. bek. Schm.* p. 134. n. 1349 (1822).
Philampelus eacus, Walker, *List Lep. Ins. B. M.* viii. p. 179. n. 9 (1856) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 198 n. 7 (1875) (Surinam) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 576. n. 10 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 669. n. 4 (1892).
Philampelus pandorus, Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 14. n. 4 (1881) (partim ; Chiriqui) ; Bönningh., *Iris* xii. p. 126. n. 50 (1899) (Rio de Jan.).

♂♀. Cramer's figure is bad, but the pattern of the wings leaves no doubt that the figure was meant for this species, which does not seem to have been recognised (from actual specimens) as distinct since Cramer. It is mixed up in some collections with *satellitia*.

Upperside of body and wings darker olive-green than in *satellitia*. First abdominal tergite without white fringe, second far less grey in middle. White spot of palpus small. First segment of hindtarsus as long as tibia, and also as segments 2 to 4 together; midtibia not distinctly white above.——Lines of forewing, *above*, more pronounced than in *satellitia*, but very weak or altogether obsolete between M^1 and M^2 within the pale longitudinal space, which is generally of a pinkish tint ; stigma barely vestigial ; median costal semicircle prominent, but not heavier than upper portion of first discal line ; subapical costal patch triangular ; submedian posterior patch trapeziform, narrower behind than it is generally in *satellitia*.——Hindwing : a distinct distal line running costad from outer upper corner of square patch, interspace following this line not shaded with black, postdiscal line more or less separated from the submarginal band, which is narrower and more sharply defined proximally than in *satellitia*.

Underside as dark as in *satellitia*.

♂. Tenth tergite as in *satellitia*, but less pointed. Clasper rather short, without patch of bristles on inner surface ; harpe as in *adamsi* and *fasciatus* with two processes (Pl. XLVIII. f. 7, lateral view ; f. 8, dorsal view) ; the process corresponding to that of *satellitia* short and not much curved, partly concealed in lateral aspect by a broad, obtuse, compressed lobe.

Larva not known to science. Bönninghausen refers to it as being green, and very different from the caterpillars of *satellitia* and *anchemolus*, and feeding on *Jussieua*. It is worthy of special note that this *Jussieua*-feeder has the same harpe as *fasciatus*, also a *Jussieua*-feeder ; judging from this we may expect the larva of *adamsi* to occur also on *Jussieua*.

Hab. Ecuador ; Surinam ; southward to Sta. Catharina.

In the Tring Museum 3 ♂♂, 3 ♀♀ from : Sta. Catharina ; Espiritu Santo ; Paramba, Ecuador (Flemming).

In coll. Charles Oberthür 4 ♀♀ from French Guiana.

Our Paramba specimen, a ♀, is very pale ; it is a bred specimen, and apparently killed too soon after emergence from the chrysalis.

413. **Pholus adamsi** spec. nov. (Pl. II. f. 2, ♂).

♂. Body above vinaceous-cinnamon ; a black mesial line on head and mesonotum, abbreviated in front and behind, no dark patch or streak on mesothoracical tegula ; metanotum black ; a small lateral spot on second abdominal segment, and a large subtriangular dorso-lateral patch on the third and fourth segments brownish black. Underside of body more red, palpus vinaceous-rufous, white at extreme base ; a white dash behind eye ; abdomen vinaceous-pink.

Wings, *above*.——Forewing : vinaceous-cinnamon, dusted with brown scales ; lines nearly as in *translineatus*, but basal dot larger ; five discal lines, the most distal one almost continuous, its posterior portion being less proximal than in *translineatus*.——Hindwing : a large black patch from base to end of cell continued towards anal angle, where it joins the black anal patch ; this branch of the patch dilated at M^1 and joining a black postdiscal band, which does not reach costal margin, but has the appearance of being a continuation of the black anal patch, corresponding to the postdiscal band of *typhon*, *fasciatus*, etc. ; abdominal and costal margins pinkish red, distal margin salmon-red ; centre of wing and a subbasal patch before abdominal margin grey, with a shade of olive-buff.

Underside vinaceous-ferruginous, more vinaceous-red towards abdominal margin of hindwing ; both wings crossed on disc by three blackish brown lines, which become red in posterior half of hindwing, and are parallel with one another as well as with outer margins, but curving costad on both wings.——Forewing : basal area greyish brown, blackish behind cell ; outer margin with a broad greyish brown band shaped as in *fasciatus*, *vitis*, etc.——Hindwing : extreme base as on forewing ; outer margin very thinly brown, this brown border slightly widened between M^2 and SM^2.

Hindtibia shorter scaled than in *fasciatus* ; foretibia with a few spines at end. First segment of hindtarsus as long as tibia.

♂. Tenth tergite slender, sharply pointed. Clasper with strongly convex ventral margin ; friction-scales inconspicuous ; no patch of bristles on inner side ; harpe with two processes, the upper process corresponding to that of *satellitia*, pointed, curved, bent laterad and ventrad ; the other process broad, feebly chitinised, obtuse, subconical, hollow (Pl. XLVIII. f. 9, lateral aspect). Penis-sheath ending in an acute stout process, which is more curved than ordinarily in this genus.

♀ and early stages not known.

Length of forewing, ♂, 40 mm. ; breadth, 16 mm.

Hab. Venezuela.

One ♂ in the Tring Museum ; a second ♂ in Mus. Stockholm ; not seen in other collections.

Named in honour of H. J. Adams, who gave us the specimen in exchange.

Easily recognised by the colour of the hindwing, in which it differs widely from *translineatus*.

414. Pholus translineatus.

**Philampelus translineatus* Rothschild, *Iris* vii. p. 299. n. 7. t. 7. f. 2 (♂) (1894) (St. Catharina ;— coll. Staudinger).

♂. Hindwing without red colour. Abdomen without black lateral spot on second segment.

Hab. Sta. Catherina.

Three ♂♂ in coll. Staudinger, 2 from Sta. Catherina, 1 without locality. Not seen in other collections.

415. Pholus achemon.

Sphinx achemon Drury, *Illustr. Ex. Ent.* ii. t. 29. f. 1. & *Index* (1773) ("Jamaica, Dr. Fothergill," *err. loci*) ; Goeze, *Ent. Beytr.* iii. 2. p. 218. n. 50 (1780).

Sphinx crantor Cramer, *Pap. Exot.* ii. p. 11. t. 104. f. A (1777) ("Ind. or." *err. loci*) ; Goeze, *l.c.* iii. 2. p. 222. n. 68 (1780) ; Fabr., *Spec. Ins.* ii. p. 151. n. 51 (1781) ; id., *Mant. Ins.* ii. p. 97. n. 55 (1787) ; Gmel., *Syst. Nat* i. 5. p. 2380. n. 73 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 375. n. 58 (1793) ("Ind. or." *err. loci*) ; Abb. & Smith, *Ins. Georgia* i. p. 81. t. 41 (*l., p., i.*) (1797) ; Lepell. & Serv., *Enc. Méth.* x. p. 466. t. 66. f. 9 (1825).

Pholus crantor, Hübner, *Verz. bek. Schm.* p. 138. n. 1435 (1822).

Philampelus crantor, Lucas, in Sagra, *Hist. Cuba* vii. p. 293 (1856) ("Jamaica" *err. loc.*) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 199. n. 9 (1875) ("Jamaica" *err. loc.*).

Philampelus achemon, Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 300. n. 3 (1839) (= *crantor ?*) ; Walk., *List Lep. Ins. B. M.* viii. p. 174. n. 2 (1856) (N. York) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 155. n. 43 (1859) (N. York ; Penn.) ; Morris, *Cat. Lep. N. Am.* p. 19 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 177. n. 2 (1862) ; Harris, ed. Flint, *Ins. Inj. Veg.* p. 325. f. 150 (*l.*). 151 (*p.*). t. 5. f. 3 (*i.*) (1862) ; Lintn., *Proc. Ent. Soc. Philad.* iii. p. 660 (1864) (life hist.) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 158. n. 56 (1865) (Atlantic distr.) ; Harr., *Ent. Corresp.* t. 3. f. 11 (*l.*) (1869) ; Riley, *Amer. Ent.* ii. p. 54. fig. 33, 34. 35 (*l., p., i.*) (1869) ; Lintn., *Ent. Contr.* i. p. 192 (1872) (N. York, larva in vii. ix.) ; Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass. ; vii.) ; Ril., *Rept. Missouri* ii. p. 74. f. 49—51 (*l., p., i.*) (1874) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 21 (1874) ; id., *l.c.* iii. p. 226. n. 29 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 575. n. 6 (1877) (N. York) ; Dimm. & Mann, *Psyche* ii. p. 68 (1877) (liter. rel. to met.) ; Worth., *Canad. Ent.* ix. p. 178 (1877) (Chicago ; imago hibern. ?) ; Grote, *l.c.* iii. p. 222. n. 31 (1877) (Mass. ; N.Y. ; Penn. ; South. States) ; French, *Trans. Dept. Agr. Illin.* xv. p. 165. fig. (1877) ; Saund., *Canad. Ent.* x. p. 100. f. 4. 5. 6 (1878) (life hist.) ; id., *Rept. Ent. Soc. Ont* xii. p. 74. fig. (1879) ; Butl., *Papilio* i. p. 104 (1881) ; Behr, *ibid.* ii. p. 2 (1882) (Calif.) ; Saund., *ibid.* p. 147 (1882) (larva) ; Coq., *Trans. Dept. Agr. Illin.* xviii. *App.* p. 182 fig. (1882) ; Saund., *Ins. Inj. Fruits* p. 250. n. 134. fig. 260. 261. 262 (*l., p., i.*) (1883) ; Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine ; larva notic.) ; Bowl., *ibid.* xvi. p. 39 (1884) (Montreal) ; Grote, *ibid.* xviii. p. 132. n. 40 (1886) ; Fern., *Sphing. N. Engl.* p. 60. n. 28. t. 4. f. 1. 2. 3. (*l., p., i.*) (1886) ; Edw., *Canad. Ent.* xx. p. 12 (1887) (N.E. Arizona) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 145. t. 6. f. 5 (genit.) (1888) (Atlantic to Pacific) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 41 (1889) (liter. rel. to metam.) ; Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 308. n. 3 (A) (1896) (partim ; Mexico) ; Cross, *Ent. News* vii. p. 297 (1896) (N. Hampsh.) ; Trum., *ibid.* viii. p. 27 (1897) (S. Dakota) ; Rowl., *ibid.* ix. p. 191 (1898) (Missouri) ; id., *ibid.* x. p. 10 (1899) (Missouri ; larva).

Smerinthus achemon, Lepelletier & Serv., *Enc. Méth.* x. p. 441 (1825).

Chaerocampa achemon, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep. Suppl.* ii. p. 92. n. 1527 (1857).

Pholus achemon, Beutenmüller, in Riley, *Ins. Life* iii. p. 322 (1891) (N. York, at electr. light) ; Kirby, *Cat. Lep. Het.* i. p. 670. n. 1 (1892) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 289. t. 3. f. 6 (1895) (N. York, two broods) ; Kirby, in Allen, *Nat. Libr., Moths.* iv. p. 38 (1897).

♂ ♀ Spines of external row of foretarsus somewhat prolonged. R^2 of hindwing before or in centre of cell ; D^3 longer than D^4. First segment of palpus without white spot.

♂. Tenth tergite widest beyond middle in lateral aspect, apex thinned, sharply

pointed, curved downwards. Clasper narrowed from middle to end, dorsal margin convex near base, then nearly straight ; a large subapical patch of bristles on inner surface ; harpe of the *satellitia*-type, process shorter than in that species. Penis-sheath with a slender, pointed process.

Larva green or red-brown, six white lateral elongate spots.—Food-plants : *Vitis* and *Ampelopsis*.

Cremaster of pupa triangular, flattened, rough.

Hab. Nearctic Region, from the Atlantic to the Pacific, extending into Mexico.

In the Tring Museum 2 larvae, 2 pupae, 50-odd specimens from : N. Jersey ; W. Virginia ; Colorado ; Phoenix, Arizona, v. vi. (Dr. Kunze); Prescott (v.), Phœnix (v.), Jerome (vi.), and Flagstaff (vii.), Arizona (Oslar) ; Albuquerque, New Mexico (Oslar) ; Gold Hill, Oregon (Biedermann).

416. **Pholus typhon.**

**Sphinx typhon* Klug, *Neue Schm.* t. 3. f. 1 (1836) (Mexico ;—Mus. Berlin).

Philampelus typhon, Walker, *List Lep. Ins. B. M.* viii. p. 177. n. 5 (1856) (Mexico) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 155. n. 41 (1859) ; Morris, *Cat. Lep. N. Am.* p. 19 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 178. n. 3 (1862) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 158. n. 57 (1865) (tropical contin. distr.); Boisd., *Spec. Gén. Lép. Hét.* i. p. 204. n. 14 (1875) (Mexico); Butl., *Trans. Zool. Soc. Lond.* ix. p. 575. n. 5 (1877) (Mexico) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 14. n 3 (1881) (Oaxaca) ; Edw., *Ent. Amer.* iii. p. 223 (1888) ; Kirby, *Cat. Lep. Het.* i. p. 668. n. 6 (1892) ; Druce, *l.c. Suppl.* p. 308 (1896) (Durango).

♂ ♀. A magnificient species, intermediate between *strenua* and *fasciatus* on one side, and *achemon* on the other, but nearer *achemon*. Hindwing above from base to disc, and forewing below (distal marginal border excepted) red. Palpus without white spot. Brown patch of mesonotum as large as in *achemon*. Brown triangular postdiscal costal patch of forewing above continued backwards and joining the triangular patch which stands at hinder margin near angle, the band thus formed thinnest between R^3 and M^1, where it is often interrupted ; proximally of this band there is a well-marked brown line, with the interspace pale. External spines of first protarsal segment not prolonged. R^2 of hindwing before centre of cell, D^3 longer than D^1.

♂. Tenth tergite slender, ending in a sharp point. Clasper broad ; a large patch of bristles filling up the greater part of the apical half of the inner surface ; harpe of the *satellitia*-type, not essentially different from that of *satellitia lucaon*. Process of penis-sheath acute, about twice as long as the sheath is broad.

Early stages not known.

Hab. Mexico.

In the Tring Museum 1 ♂, 1 ♀ from : Jalisco, Mexico.

417. **Pholus strenua.**

Chaerocampa strenua Ménétries, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 132. n. 1523. t. 12. f. 3 (1857) (Haiti).

Philampelus strenuus, Grote, *Proc. Ent. Soc. Philad.* v. p. 60 (1865) ; id. & Rob., *ibid.* v. p. 157. n. 53 (1865) (Haiti) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 574. n. 4 (1877).

Philampelus (*Dupo*) *mirificatus* Grote, *Bull. Buffalo Soc. N. Sc.* ii. p. 148 (1875) (Cuba).

Philampelus strenua, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 203. n. 13 (1875).

Philampelus mirificatus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 575. n. 8 (1877) (Cuba) ; Kirby, *Cat. Lep. Het.* i. p. 669. n. 2 (1892).

Dupo strenua, Kirby, *Cat. Lep. Het.* i. p. 668. n. 5 (1892).

**Dupo domingonis* Rothschild, Nov. Zool. i. p. 83 (1894) (S. Domingo ;—Mus. Tring).

♂♀. Intermediate between *vitis* and *satellitia*, bearing a rather close resemblance to *Ph. satellitia posticatus* from Cuba. The figure of the ♀ given by Ménétriés is not very exact, and misled Grote as well as Rothschild to redescribe the species.——Forewing, *upperside*: a pale subbasal and a pale discal band as in *vitis*, stigma divided as in *vitis*; pale longitudinal band vestigial in basal half; submarginal area nearly as in *posticatus*; a pale curved band from apex to R^3, followed before hinder angle by a pale patch.——Hindwing of the same type as in *vitis*, black discal line less obvious, submarginal band much narrower.——*Under surface* vinaceous-red with brown border. First segment of hindtarsus nearly as long as tibia.

♂. Tenth tergite pointed as in *satellitia*. Dorsal margin of clasper almost straight, slightly concave; harpe nearly as long as in *anchemolus*, slenderer, tip more pointed and curved upwards, intermediate between *anchemolus* and *vitis*. Process of penis-sheath long, pointed, about five times as long as the sheath is broad.

Hab. Haiti and Cuba.

In the Tring Museum 1 ♂ from Haiti.

418. Pholus vitis.

Merian, *Metam. Ins. Surin.* t. 47. fig. sup. (*l., p., i.*) (1705).

Sphinx vitis Linné, *Syst. Nat.* ed. x. p. 491. n. 14 (1758); id., *Mus. Lud. Ulr.* p. 354 (1764); Houtt., *Naturl. Hist.* i. 11. p. 438. n. 14 (1767) (partim); Linné, *Syst. Nat.* ed. xii. p. 801. n. 16 (1767); Müll., *Naturs.* v. 1. p. 640. n. 16 (1774) (partim); Fabr., *Syst. Ent.* p. 542. n. 19 (1775) (partim); Cram., *Pap. Exot.* ii. p. 138. t. 268. f. E (1780); Burm., *Abh. Nat. Ges. Halle* p. 64 (1854); Weym., *Stett. Ent. Zeit.* xxxvi. p. 46 (1875); Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 135 (1882) (recensio critica; specim. typ. praeserv.).

Dupa vitis, Hübner, *Verz. bek. Schm.* p. 137. n. 1466 (1822).

Philampelus hornbeckiana Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 299 note (1839) (St. Thomas).

Philampelus vitis, Walker, *List Lep. Ins. B. M.* viii. p. 176. n. 4 (1856) (partim).

Philampelus linnei Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 157. n. 51. t. 3. f. 3 (♀) (1865).

We cannot quite understand how it is possible that anybody, after the clear statements of Weymer (1875) and Aurivillius (1882), could any longer follow Messrs. Grote and Robinson in considering as Linné's *vitis* the species with red distal and abdominal borders to the hindwing. The authors of *linnei* were wrong in their interpretation of Linné's description, not to say careless, being probably misled by a wrongly coloured copy of Merian's *Met. Ins. Surin.* There remains not the shadow of a doubt about which insect is the real *vitis*, if one has compared Merian's figure and Linné's description. The true *vitis* is the vine-feeder with only the abdominal margin of the hindwing red and the stigma of the forewing divided, and not the species which feeds on *Jussieua* and has a simple stigma on the forewing and red abdominal and distal borders to the hindwing. If the descriptions of Linné, Fabricius, etc., were all as clear as that of *vitis*, there would be no disagreement as to the application of their names. Why nearly all authors adhere to the opinion of Grote and Robinson we cannot imagine, but they are really more to blame than the authors of the muddle themselves, considering that the error has been pointed out several times. John Smith (1888) goes even so far as to say, "Messrs. Grote and Robinson have given a very full history of the two forms [*vitis* and *linnei*], satisfactorily straightening out the confusion theretofore existing. It will be sufficient to refer the student to this bit of careful study, and to note my full concurrence in their views." Surely, Prof. Smith cannot have compared the original descriptions or Merian's figure.

In order to enable those of our readers who have no access to the literature in question to arrive at an independent opinion, we give the following facts :—

1. We have in the Tring Museum four editions of Merian's *Met. Ins. Surinam* ; other copies of the work have also been compared. Now, the black design of the upper figure of Plate XLVII. is the same in all copies, the stigma being plainly DIVIDED as in the vine-feeder, not in the *Jussieua*-feeder. But the colouring is utterly different, as follows :—

a. Latin edition of 1705 ; library at Göttingen :—
Distal and abdominal margins of hindwing red.

b. Dutch edition of 1705, in the Tring Museum :—
Distal margins of fore- and hindwing red ; abdominal margin of hindwing green.

c. Edition of 1719 :—
Right and left forewing different in pattern; distal and abdominal margins of hindwing red.

d. Latin and French edition of 1726, in the Tring Museum :—
Wings nearly entirely crimson, a narrow green band on forewing ; distal and abdominal margins of hindwing green, with the red colour of the disc extending to distal margin posteriorly on the left wing. The figure in the copy contained in the library at Göttingen is only partly coloured ; the disc of the hindwing is green.

e. Dutch edition of 1830, in the Tring Museum :—
Distal and abdominal margins of hindwing red as in the *Jussieua*-feeder ; stigma of forewing so thickly smeared over with brown that the white dividing line is not visible except by close inspection.

2. Linné's descriptions of the wings are as follows :—

f. In *Syst. Nat.* ed. x. :—
"*alis cinereis fusco-variis : posticis margine tenuiore sanguineis.*"

g. In *Mus. Lud. Ulr.* :—
"*alae posticae supra cinereae. Fascia nigricans versus marginem posticum. Macula nigra in disco. Margo anterior albus, interior Macula sanguinea.*"

h. In *Syst. Nat.* ed. xii. :—
"*alis cinereis fusco variis : posticis margine interiore sanguineis.*"

It will be noticed that :—

a'. *Margo tenuior* is the same as *margo interior* (see *a* and *c* ; Fabricius also employs sometimes *tenuior* for *interior*).

b. Linné speaks of *margo posticus*, *margo anterior*, and *margo interior* in *Mus. Lud. Ulr.*

Comparing other descriptions of Linné we find that his *margo posticus* is the distal margin (see description of *carolina*), the *margo anterior* the costal margin, and the *margo interior* the abdominal margin. This *margo interior* alone is described as red in *vitis* (see *f*—*h*). Sapienti sat.

♂ ♀. Forewing, *upperside* : a subbasal band from costal to inner margin crossing vein M just proximally of M^1 ; stigma round, divided by the pale cross-vein D^3 ; pale discal band curved costad ; distal marginal border with a grey or white line at proximal edge ; all these characters shown in Merian's figure.——Hindwing : a black discal line from upper distal angle of square patch costad ; a black, continuous, submarginal band, preceded by a more or less completely separate line.

♂. Tenth tergite as in *satellitia*, acute and slender. Clasper with dorsal margin concave ; innerside hairy, no patch of bristles ; harpe as in *satellitia*, but longer (Pl. XLVIII. f. 1). Process of penis-sheath rather more curved and less slender than in *satellitia*.

Larva green, with red dorsal line, third and fourth segments dotted with black ; four or five white, elongate, oblique side-patches, encircled with black (Merian's figure has three spots only, but shows the black dots on third and fourth segments). —Food-plants : *Vitis* and *Ampelopsis*.

Pupa not known to us; Merian's figure not sufficiently correct, cremaster curved as in *anchemolus*.

Hab. Neotropical Region, including the West Indies ; occasionally northward to New England.

Two subspecies :

a. Ph. vitis vitis.

Merian, l.c.

Sphinx vitis Linné, *l.c.*

Dupo vitis, Hübner, *l.c.*

Philampelus hornbeckiana Harris, *l.c.* ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 157. n. 52 (1865) (St. Thomas) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 201. n. 11 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 574. n. 3 (1877).

Philampelus vitis, Walker, *l.c.* ; Lucas, in Sagra, *Hist. Cuba* vii. p. 293. t. 17. f. 4 (1856) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 156. n. 46 (1859) (partim); Morris, *Cat. Lep. N. Am.* p. 19 (1860) (partim) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 179. n. 5 (1862) (*=hornbeckiana?*) ; Herr.-Sch., *Corresp. Bl.* p. 58 (1865) (Cuba) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 156. n. 50 (1865) (partim) ; Boisd., *Cons. Lép. Guatemala* p. 69 (1870) ; Weym., *Stett. Ent. Zeit.* xxxvi. p. 46 (1875) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 200. n. 10 (1875) (Cayenne ; Brazil) ; Hall, in Riley, *Ins. Life* i. p. 319 (1889) (Ohio, on Grape and *Ampelopsis*) ; Dew., *Mitth. Münch. Ent. Ver.* i. 92 (1877) (Porto Rico) ; Auriv, *l.c.* (1882).

Chaeroeampa vitis, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep. Suppl.* ii. p. 92. n. 1522 (1857) (Haiti ; Brasilia).

Philampelus fasciatus, Grote, *Proc. Ent. Soc. Philad.* v. p. 59 (1865) (partim).

Philampelus linnei id. & Rob., *l.c.* v. p. 157. n. 51. t. 3. f. 3 (♀) (1865) ; Grote, *ibid.* vi. p. 328 (1867) ; id., *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) (syn. partim) ; Möschl., *Stett. Ent. Zeit.* xxxv. p. 307 (1874) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 21 (1874) (Alabama) ; id., *l.c.* ii. p. 226. n. 27 (1875) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 348 (1876) (Surinam ; synon. !) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 574 n. 2 (1877) (Mexico ; Haiti) ; Grote, *l.c.* iii. p. 222. n. 29 (1877) (Alabama) ; Burm., *Descr. Rép. Argent.* v. p. 351. n. 5 (1878) (Corrientes) ; id., *l.c. Atlas* p. 58 (1879) (*= vitis* Linné) ; Gundl., *Contr. Ent. Cubana* p. 191 (1881) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 13. n. 2 (1881) (Mexico ; Guatemala ; Chiriqui) : Lintn., *Papilio* iv. p. 145. n. 2 (1884) (R. Grande, Texas) ; Grote, *Canad. Ent.* xviii. p. 132. n. 37 (1886) ; id., *Hawk Moths N. Am.* p. 32 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 141 (1888) (northward to Massachusetts) ; Bentenm., *Bull. Amer. Mus. N. H.* iv. p. 60 (1892) (Cuba) ; id., *ibid.* vii. p. 291 (1895) ; Druce, *l.c. Suppl.* p. 308 (1896) (Mexico ; Brit. Hond. ; Guatem. ; Nicaragua ; Tobago !.).

Dupo linnei, Kirby, *Cat. Lep. Het.* i. p. 668. n. 2 (1892) ; Bönningh., *Iris* xii. p. 127. sub n. 51 (1899) (not found near Rio de Jan.).

Dupo hornbeckiana, Kirby, *l.c.* n. 4 (1892).

♂ ♀. The ♂♂ from Argentina, Paraguay, and Southern Brazil differ from those from more northern localities in the clasper being pointed instead of evenly rounded at end. These specimens have, like their ♀♀, the lines of the forewing a little more white than northern examples. The darkest individuals occur on the Leeward Islands, St. Vincent, Sta. Lucia, etc. ; in these the white lines are almost absent from the forewing in some of the few specimens seen.

Harris's description of *hornbeckiana* applies to this insect; Harris's *vitis* is *fasciatus*.

Larva: see above.

Hab. Neotropical Region except Jamaica; northward to New England.

In the Tring Museum 3 larvae, 66-odd specimens from: Nassau, Bahamas (Sir G. Carter); Cuba; Mexico to Bolivia; Paraguay; Sao Paulo; Venezuela; St. Vincent; Grenada.

b. Ph. vitis hesperidum.

**Pholus hesperidum* Kirby, *Proc. Roy. Dublin Soc.* (2). ii. p. 340 (1880) (Jamaica;—Mus. Dublin); Waterh., *Aid Ident. Ins.* i. t. 47 (1880).

Dupo hesperidum Kirby, *Cat. Lep. Het.* i. p. 668. n. 3 (1892) (Jamaica).

Dupo hesperidium (!), Smyth, *Ent. News* xii. p. 108 (1901).

♂. Pale markings of upperside more white than in the preceding; pale streak R^3 of forewing vestigial or absent; under surface almost wholly vinaceous-red.

Hab. Jamaica.

In the Tring Museum 3 ♂♂ from: Rae Town, at light, Sept. 1897, and Kingston, at light (Taylor); Jamaica.

419. Pholus fasciatus.

Sphinx vitis, Drury (*non* Linné, 1758), *Illustr. Ex. Ins.* i. p. 60. t. 28. f. 1 & *Index* (1773); Fabr., *Syst. Ent.* p. 542. n. 19 (1775) (partim); Den. & Schiff., *Verz. Schm. Wien* p. 47. frontispiece (1776); Goeze, *Ent. Beytr.* iii. 2. p. 164. n. 16 (1780) (partim); Cram., *Pap. Exot.* iii. p. 136. t. 267. f. c (1780); Fabr., *Spec. Ins.* ii. p. 147. n. 35 (1781) (partim); Roem., *Gen. Ins.* p. 72. n. 148. t. 20. f. 1 (1785); Fabr., *Mant. Ins.* ii. p. 96. n. 39 (1787) (partim); Gmel., *Syst. Nat.* i. 5. p. 2380. n. 16 (1790) (partim); Fabr., *Ent. Syst.* iii. 1. p. 369. n. 41 (1793) (partim); Abb. & Smith, *Ins. Georgia* i. p. 79. t. 40 (*l., p., i.*) (1797).

Sphinx fasciatus Sulzer, *Gesch. Ins.* p. 151. t. 20. f. 1 (1776).

Enmorpha elegans jussieuae Hübner, *Samml. Ex. Schm.* i. t. 169 (180-?).

Sphynx strigilis Vogel, *Schmett. Cab.* iii. p. 17. t. 6. f. 7 (1822) (N. York).

Dupo jussieuae Hübner, *Verz. bek. Schm.* p. 137. n. 1467 (1822); id., *Samml. Ex. Schm.* ii. t. 163 (1824 ?).

Philampelus vitis, Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 299. n. 1 (1839); Dunc., in Jard., *Nat. Libr.* xxxvii. p. 104. t. 5 (*l., p., i.*) (1841); Grote, *Proc. Ent. Soc. Philad.* v. p. 58. 83 (1865) (Cuba); id. & Rob., *ibid.* v. p. 156. n. 50 (1865); Grote, *l.c.* vi. p. 328 (1867); id. & Rob., *Trans. Amer. Ent. Soc.* ii. p. 76 (1869); Grote, *ibid.* iii. p. 184 (1871) (syn. partim); Möschl., *Stett. Ent. Zeit.* xxxv. p. 303 (1875) (synon. erroneous!); Butl., *Trans. Zool. Soc. Lond.* ix. p. 574. n. 1 (1877) (Mexico; Jamaica; Haiti; Brazil); Dimm. & Mann, *Psyche* ii. p. 67 (1877); Berg, *Bull. Moscou* p. 204. n. 16 (1875)) (Patagonia; descr. of larva); Burm., *Descr. Rép. Argent.* v. p. 352. n. 6 (1878) (Patagonia; Buenos Ayres); id., *l.c. Atlas* p. 58 (1879); Gundl., *Contr. Ent. Cubana* p. 188 (1881); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 13. n. 1 (1881) (Mexico; Costa Rica; Chiriqui); Grote, *Canad. Ent.* xviii. p. 132. n. 36 (1886); id., *Hawk Moths N. Am.* p. 32 (1886); Edw., *Ent. Amer.* iii. p. 164 (1887) (Florida); Smith, *Trans. Amer. Ent. Soc.* xv. p. 142. t. 6. f. 6 (genit.) (1888) (northward to Massachusetts); Edw., *Bull. U. St. N. Mus.* xxxv. p. 40 (1889) (liter. rel. to metam.); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 290. t. 3. f. 7 (1895) (N. York, rare); Druce, *l.c. Suppl.* p. 307 (1896) (Mexico; Nicaragua).

Philampelus jussieuae, Walker, *List Lep. Ins. B. M.* viii. p. 177. n. 6 (1856); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 157. n. 47 (1859); Morris, *Cat. Lep. N. Am.* p. 19 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 180. n. 6 (1862); Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 76 (1869); Boisd., *Spec. Gén. Lép. Hét.* i. p. 202. n. 12 (1875) (descr. of larva).

Philampelus fasciatus, Lucas, in Sagra, *Hist. Cuba* vii. p. 193. t. 17. f. 5 (1856); Herr.-Sch., *Corresp. Bl.* p. 58 (1865) (Cuba); Walk., *l.c.* xxxv. p. 1854 (1866); Weym., *Stett. Ent. Zeit.* xxxvi. p. 46 (1875); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 348 (1876) (Surinam; synon.!); Dew., *Mitth. Münch. Ent. Ver.* i. p. 92 (1877) (Porto Rico); Maass., *Stett. Ent. Zeit.* xli. p. 58 (1880).

Dupo vitis, Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 21 (1874) (N. Jersey ; South. States) ; Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., vi.) ; Grote, *l.c.* ii. p. 226. n. 26 (1875) ; id., *l.c.* iii. p. 222. n. 28 (1877) (Mass. ; Penn. ; Sonth. States) ; Kirby, *Cat. Lep. Het.* i. p. 668. n. 1 (1892) ; id., in Allen, *Nat. Libr., Moths* iv. p. 37. t. 103 (*l., p., i.*) (1897) (syn. partim).

Dupo fasciatus, Bönninghausen, *Iris* xii. p. 127. n. 51 (1899) (Rio de Jan. ; larva).

♂ ♀. Tibiae shorter scaled than in *vitis*. First segment of hindtarsus very little shorter than tibia.——Forewing, *above*, with a single straight line behind base of M^2, at right angles to hinder margin ; stigma appearing simple, triangular, owing to the proximal part (within cell) being scarcely deeper in tint than the rest of the cell.——Hindwing without black discal line ; a broad black postdiscal band from C to M^2, sharply defined, followed behind M^2 by a faint postdiscal and a black submarginal line ; distal margin red, except from M^2 backwards ; abdominal margin rather brighter red ; interspace between black square patch and brown distal marginal band M^2—SM^2 also red. Hindwing below with abdominal area more extended rosy red than in *vitis*.

♂. Tenth tergite pointed. Clasper densely hairy inside ; dorsal margin nearly straight ; harpe (Pl. XLVIII. f. 6) with two processes as in *eacus* and *adamsi* : one pointed, curved, resembling the hook of other species, partly covered by the second, which is short, obtuse, compressed, broad. Penis-sheath stout ; process short, triangular (Pl. LIV. f. 26).

Larva very different in adult stage from that of *vitis*, being particoloured with numerous black ringlets, and, on segments 4 to 11, with narrow oblique white lateral bands, extending over two segments. In the young caterpillar the white side-bands are confined to one segment each, and the black transverse lines are rudimentary.—Food-plant : *Jussieua*.

Pupa : cremaster rough ; labrum somewhat projecting as a small tubercle ; head beneath a little more convex than dorsally.

Hab. Neotropical Region, extending southward to Patagonia, and northward into the Nearctic Region, occasionally wandering to New England.

In the Tring Museum 1 pupa, 60-odd specimens from : South Carolina to Buenos Ayres and St. Catharina ; Cuba ; Haiti ; Jamaica ; not from the Andes of Ecuador, Peru, and Bolivia, where it doubtless occurs.

420. Pholus phorbas.

Sphinx phorbas Cramer, *Pap. Exot.* i. p. 86. t. 55. f. B (1775) (Ind. occ. ? Ind. or. ?) ; Goeze, *Ent. Beytr.* iii. 2. p. 220. n. 59 (1780) ; Stoll, in Cram., *l.c.* iv. p. 65 (1780) (Surinam) ; Fabr., *Spec. Ins.* ii. p. 145. n. 25 (1781) ; id., *Mant. Ins.* ii. p. 95. n. 28 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2379. n. 70 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 365. n. 30 (1793) ; Lep. & Serv., *Enc. Méth.* x. p. 466. t. 66. f. 4 (1825).

Sphinx pandion Stoll, in Cram., *l.c.* iv. p. 65. t. 321. f. A (1780) (Surinam).

Sphinx phorbus (!), Fabricius, *l.c. Index* p. 157 (1796).

Argeus pandion, Hübner, *Verz. bek. Schm.* p. 134. n. 1443 (1822).

Philampelus phorbas, Walker, *List Lep. Ins. B. M.* viii. p. 179. n. 10 (1856) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 193. n. 2 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 577. n. 17 (1877).

Argeus (*l*) *phorbas*, Kirby, *Cat. Lep. Het* i. p. 670. n. 2 (1892) (Surinam)

♂ ♀. Brown stripe of thorax and abdomen broad, about half the width of the frons, not widened to large patches on fifth and sixth abdominal segments. *Underside* of wings and body nearly wholly yellow. Midtibia white above from base to apex. R^2 of hindwing below centre of cell, D^2 obviously shorter than D^1 as a rule.

♂. Tenth tergite ending in a long sharp point. Clasper narrowed from middle

to end, dorsal margin convex before middle, mesial basal fold large ; harpe of the *satellitia*-type, the process swollen at base and somewhat bent away from the clasper. Penis-sheath stout, *without* process.

Early stages not known.

Hab. Neotropical Region : Venezuela ; Surinam ; Trinidad ; Para.

In the Tring Museum 1 ♂, 2 ♀♀ from : Pt. of Spain, Trinidad, February 1896 (Dr. Percy Rendall) ; Aroa, Venezuela, April 1893 ; Surinam, ex coll. Eyndthoven (Cramer's type ?).

In the Bern Museum from Para (Dr. Goeldi), at the electric light, vi.

421. Pholus capronnieri.

**Philampelus capronnieri*, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 194. n. 3. t. 7. f. 2 (1875) (Oyapock ; —coll. Charles Oberthür) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 630 (1877) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 348 (1876) (Surinam).

Argeus (?) *capronnieri*, Kirby, *Cat. Lep. Het.* i. p. 670. n. 3 (1892) (Oyapock).

Argeus capronnieri (!), Smyth, *Ent. News* xii. p. 108 (1901).

♂♀. Head and mesonotum with blackish brown mesial stripe ; side-stripe narrow, widened on the fifth and sixth abdominal segments to two patches. *Underside* of wings and body less yellow, especially in the ♀♀, than in *phorbas*. Position of R^2 of hindwing as in the preceding.

♂. Sexual armature nearly identical with that of *phorbas* ; process of harpe less bent away from the clasper.

Early stages not known.

Hab. Neotropical Region : Surinam ; Venezuela ; Amazons ; Ecuador.

In the Tring Museum 2 ♂♂, 7 ♀♀ from : Peru ; Paramba, Ecuador ; Manaos; Aroa and Palma Sola, Venezuela.

422. Pholus labruscae.

Merian, *Met. Ins. Surin.* t. 34 (1705) ; Seba, *Thesaur.* iv. p. 66. t. 56. f. 10. 11 (1765).

Sphinx labruscae Linné, *Syst. Nat.* ed. x. p. 491. n. 12 (1758) ; Clerck, *Icon. Ins.* ii. t 47. f. 3. (1764) ; Linné, *Mus. Lud. Ulr.* p. 352 (1764) ; id., *Syst. Nat.* ed. xii. p. 800. n. 14 (1767) ; Houtt., *Naturl. Hist.* i. 11. p. 437. n. 12 (1767) ; Müll., *Naturs.* v. 1. p. 639. n. 14 (1774) ; Fabr., *Syst. Ent.* p. 546. n. 34 (1775) ; Cram., *Pap. Exot.* ii. p. 133. t. 184. f. A (1777) ; Goeze, *Ent. Beytr.* iii. 2. p. 163. n. 14 (1780) ; Fabr., *Spec. Ins.* ii. p. 152. n. 57 (1781) (=*clotho*) ; id., *Mant. Ins.* ii. p. 98. n. 63 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2380. n. 14 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 377. n. 66 (1793) ; Swains., *Zool. Illustr.* i. t. 87 (1822) (Jamaica) ; Lep. & Serv., *Enc. Méth.* x. p. 466. t. 67. f. 2 (1825) ; Sepp, *Pap. Surin.* i. p. 71. t. 32 (1844) ; Lucas, in Chenu, *Enc. Hist. Nat., Pap.* i. p. 10. fig. 30 (1853) ; Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 134. n. 170 (1882) (recensio critica).

Sphinx clotho, Fabricius (*non* Drury, 1773), *Syst. Ent.* p. 540. n. 12 (1775) ; Goeze, *Ent. Beytr.* iii. 2. p. 206. n. 2 (1780) (partim) ; Fabr., *Mant. Ins.* ii. p. 97. n. 57 (1787) (Cap. b. sp. ; alia spec. ? descr. mala) ; id., *Ent. Syst.* iii. 1. p. 376. n. 601 (1793) (alia spec. ?) ; Auriv. *Ent. Tidskr.* xviii. p. 153. sub n. 84 (1897) (=*labruscae*).

Eumorpha elegans labruscae, Hübner, *Samml. Ex. Schm.* i t. 167 (180–?).

Argeus labruscae, id., *Verz. bek. Schm.* p. 134. n. 1442 (1822) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 22 (1874) ; id., *l.c.* ii. p. 226. n. 30 (1875) ; id., *l.c.* iii. p. 222. n. 32 (1877) (N. Jersey ; Missouri) ; id., *Canad. Ent.* xviii. p. 132. n. 41 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 137 (1888) (northward to Canada, visitor) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 41 (1889) (liter. rel. to metam.) ; Kirby, *Cat. Lep. Het.* i. p. 670. n. 1 (1892) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 288. t. 5. f. 6 (1895) (visitor, northw. to Canada) ; Kirby, in Allen, *Nat. Libr., Moths* iv. p. 38 (1897) ; Sloss., *Ent. News* x. p. 96 (1899) (Florida) ; Bönningh., *Iris* xii. p. 125. n. 47 (1899) (Rio de Jan.).

Philampelus labruscae, Burmeister, *Sphing. Bras.* p. 58. n. 1 (1856) ; Walk., *List Lep. Ins. B. M.* viii. p. 178. n. 7 (1856) (Jamaica ; Haiti ; Mexico ; Colombia ; Venezuela) ; Lucas, in Sagra,

Hist. Cuba vii. p. 292. t. 17. f. 3 (1856) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 156. n. 45 (1859); Morris, *Cat. Lep. N. Am.* p. 19 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 178. n. 4 (1862) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 62. 82 (1865) (Cuba) ; id. & Rob., *ibid.* v. p. 158. n. 58 (1865) ; Grote, *l.c.* vi. p. 329 (1867) (Cuba) ; Berg, *Act. Ac. Nac. Argent.* i. p. 71. n. 15 (1870) (Bahia Blanca ; Rio Negro) ; Boisd., *Consid. Lép. Guatemala* p. 69 (1870) (Nicaragua) ; Grote, *Trans. Amer. Ent. Soc.* iii. p. 185 (1871) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 193. n. 1 (1875) (Guiana ; Brazil ; Antilles) ; Berg, *Bull. Moscou* p. 203. n. 15 (1875) (Patagonia, xi.) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 348 (1876) (Surinam) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 578. n. 19 (1877) (Jamaica ; Haiti ; Mexico ; Col. ; Venez.) ; Dew., *Mitth. Münch. Ent. Ver.* i. p. 92. (1877) (Porto Rico) : Burm., *Descr. Rép. Argent.* v. p. 346. n. 1. (1878) (Buenos Aires ; Patagonia) ; id., *l.c. Atlas* p. 36. t. 15. f. 7. A. B. 9 (*l.*) (1879) : Gundl., *Contr. Ent. Cubana* p. 186 (1881) ; Weism., ed. Meld., *Stud. Theory Desc.* i. p. 195 (1882) (larva) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 14. n. 7 (1881) (Mexico) ; id., *l.c. Suppl.* p. 308 (1896) (Mexico ; Guatemala ; Costa Rica).

Chaerocampa labruscae, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep. Suppl.* ii. p. 92. n. 1521 (1857) (Haiti).

♂ ♀. Head and prothorax rather longer than in the other species of *Pholus*, excepting *anchemolus*. Hindtarsus very long, first segment somewhat longer than tibia. First segment of palpus a little longer than second. Patch of modified scales near base of M of forewing below more distinct than in the other species. Easily recognised by the blue patches of the hindwing.

♂. Tenth tergite relatively very short, pointed (Pl. XLIV. f. 1). Clasper subacuminate, apex more convex dorsally than ventrally ; harpe as in *satellitia*, shorter, vertical part of hook sometimes nearly as long as horizontal part of hook (Pl. XLVIII. f. 4). Penis-sheath slender, process very short and obtuse (Pl. LIV. f. 28).

Larva : first stages green, later brown or greenish brown ; fourth segment with a small round ocellus ; young caterpillars (except first stage) with a series of seven rosy side-bands, replaced later by white spots ; adult larva with obscure pale side-band from head to anal segment, irregularly zigzag on segments 4 to 10; thoracical segments, besides, with pale ventro-lateral band and thin dorsal line ; 4th to 11th segments striated with thin short buffish lines, which are especially obvious on the back.—Food : *Vitis* ; *Ampelopsis*.

Pupa : head-case more projecting than in *satellitia*, *anchemolus*, *vitis*, far more convex ventrally than on back ; cremaster broad, short, triangular, flattened, rough.

Hab. Neotropical Region, from Patagonia northward to Canada, but only visitor in the temperate and cold northern and southern districts. Apparently everywhere in Central and South America.

In the Tring Museum 5 larvae, 3 pupae, and 70-odd specimens from : Jamaica ; Haiti ; Cuba ; Nassau, Bahamas (Sir G. Carter) ; Florida southwards to Buenos Ayres, many places.

CXIII. TINOSTOMA gen. nov.—Typus : *smaragditis*.

♂. Eye not lashed, apart from a tuft of scales near base of antenna. Palpus long and slender, second segment nearly three times as long as broad, widest before middle, tapering towards end, third segment small. Genal process narrow but prominent, shorter than the pilifer. Antenna (broken, only one half left) very strongly compressed, the ridge, bearing the fascicles of ciliae elevate subventrally, the segment, in frontal aspect, broader below middle than above middle. Abdominal segments with one row of heavy spines, which are only partly contiguous. First segment of foretarsus with many spines at base externally ; midtarsus without comb, first segment longer than 2 to 5 together, long spur about

one-third the length of the first tarsal segment (hindlegs not preserved). Wings entire; SC^2 and R^1 of hindwing on a stalk which is nearly as long as the cell is broad; R^2 from near upper angle of cell, D^3 much longer than D^4, lower angle of cell about 80°.

Tenth tergite (Pl. XLIV. f. 6) narrow, long, tip obtuse; sternite broad, apex rounded, with indication of sinus. Clasper *without* friction-scales; harpe (Pl. XLVII. f. 20) short, obtuse, dorsal edge sinuate, dilated into a short tooth proximally of sinus. Penis-sheath (Pl. LIV. f. 29) with a large apical flap, directed proximad, lying upon the sheath, and armed with long teeth at the edges, reminding one of the flap found in *Eurypteryx* (Pl. LV. f. 15—17).

Early stages not known.

Hab. Sandwich Islands.

One species.

An ally of *Pholus*; more specialised in the long palpus, the more strongly compressed antenna, the absence of a comb from the midtarsus, the position of veins R^1 and R^2 of hindwing, etc.

423. Tinostoma smaragditis.

**Deilephila ?) smaragditis* Meyrick, in Sharp, *Fauna Hawai.* i. 2. p. 191. n. 1. t. 5. f. 7 (1899) (Kauai;—Mus. Brit.).

Thorax, part of abdomen, and forewings green above; upperside of hindwing purplish brown, with a violet hue in side-view.

Hab. Makaweli, Kauai, 2000 feet; 1 ♂ in the British Museum.

Tribe **Nephelicae** nov.—Typus: *Nephele funebris*.

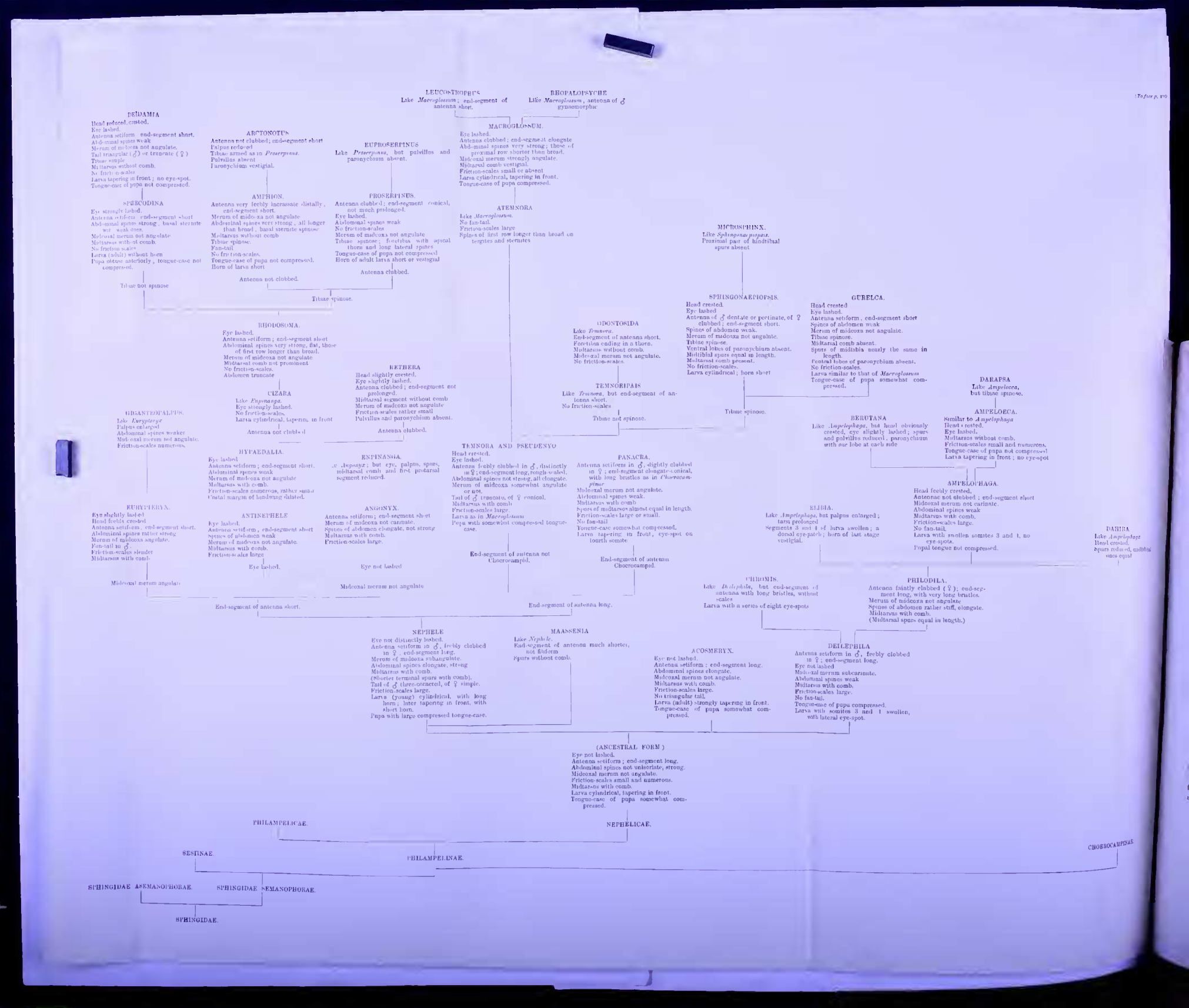
♂ ♀. Abdominal spines in more than one row.

The genera of this tribe are in more than one organ either similar to the *Sesiinae* or to the *Choerocampinae*. Very often a genus inclines towards one subfamily in one stage and towards the other subfamily in another stage. *Macroglossum*, for instance, is Sesiad in the imago and larva, but Choerocampid in the pupa; *Ampelophaga* is Choerocampid in the imago and larva, and Sesiad in the chrysalis. The imago of *Atemnora* is Sesiad in the strong flat spines, Choerocampid in the large friction-scales. Such similarities are in so far affinities as they show that the lines of development which prevail in the *Sesiinae* on the one side and in the *Choerocampinae* on the other reappear in the *Nephelicae*, a tribe of *Philampelinae*, which subfamily stands between the two others.

Progressive and retrogressive development is about equally frequent in this tribe. The normally non-crested head acquires a crest in reduced forms, like *Darapsa*, *Deïdamia*, *Sphingonaepiopsis*, and the eyes become lashed and small. On the other hand the eyes and the palpi are enlarged in *Elibia*, *Eurypteryx*, *Gigantеopalpus*. The originally conical abdomen is flattened in a number of genera: the spines, which are never absent, develop in a similar way as in the *Sesiinae*, becoming very weak in some genera and very strong and flat in others, *Macroglossum* and the two genera derived from it agreeing in the spination almost exactly with *Sesia* and allies; the basal sternite is not spinose, or has weak spines, or is as strongly spinose as the other sternites, and these sometimes nearly as strongly as the tergites, as is also the case in several *Sesiinae*. In the species with strongly spinose and flattened



(Before p. 170)


LEUCOSTROPHUS
Like Macroglossum; end-segment of antenna short.
RHOPALOPSYCHE
Like Macroglossum, antenna of ♂ gymnomorphic
DEILEMA
Head retiered, crested.
Eye lashed.
Antenna setiform end-segment short.
Abdominal spines weak
Merum of mideoxa not angulate.
Tail triangular (♂) or truncate (♀)
Tibiæ simple
Midtarsus without comb.
No friction-scales
Larva tapering in front; no eye-spot.
Tongue-case of pupa not compressed.
MACROGLOSSUM.
Eye lashed.
Antenna clubbed; end-segment elongate
Abdominal spines very strong; those of proximal row shorter than broad.
Midcoxal merum strongly angulate.
Midtarsal comb vestigial.
Friction-scales small or absent
Larva cylindrical, tapering in front.
Tongue-case of pupa compressed.
ARCTONOTUS
Antenna not clubbed; end-segment short
Palpus reflexed
Tibiæ armed as in Proserpinus.
Pulvillus absent
Paronychium vestigial.
EUPROSERPINUS
Like Proserpinus, but pulvillus and paronychium absent.
AMPHION.
Antenna very feebly increasate distally, end-segment short.
Merum of mideoxa not angulate
Abdominal spines very strong, all longer than broad, basal sternite spinose
Midtarsus without comb
Tibiæ spinose.
Fan-tail
No friction-scales.
Tongue-case of pupa not compressed.
Horn of larva short
PROSERPINUS.
Antenna clubbed; end-segment conical, not much prolonged.
Eye lashed.
Abdominal spines weak
No friction-scales
Merum of mideoxa not angulate
Tibiæ spinose; foretibia with apical thorn and long lateral spines
Tongue-case of pupa not compressed
Horn of adult larva short or vestigial
ATEMNORA
Like Macroglossum.
No fan-tail.
Friction-scales large
Spines of first row longer than broad on tergites and sternites
MICROSPHINX.
Like Sphinginæ proper.
Proximal pair of hindtibial spurs absent
SPHINGONAEPIOPSIS.
Head crested.
Eye lashed
Antenna of ♂ dentate or pectinate, of ♀ clubbed; end-segment short.
Spines of abdomen weak.
Merum of mideoxa not angulate.
Tibiæ spinose.
Midtibial spurs equal in length.
Midtarsal comb present.
No friction-scales.
Larva cylindrical; horn short
GURELCA.
Head crested
Eye lashed.
Antenna setiform, end-segment short
Spines of abdomen weak
Merum of mideoxa not angulate.
Tibiæ spinose.
Midtarsal comb absent.
Spurs of midtibia nearly the same in length.
Ventral lobes of paronychium absent.
No friction-scales.
Larva similar to that of Macroglossum
Tongue-case of pupa somewhat compressed.
Antenna not clubbed.
Tibiæ not spinose
Tibiæ spinose.
RHODOSOMA.
Eye lashed.
Antenna setiform; end-segment short
Abdominal spines very strong, flat, those of first row longer than broad.
Merum of mideoxa not angulate
Midtarsal comb not prominent
No friction-scales.
Abdomen truncate
ODONTOSIDA
Like Temnora.
End-segment of antenna short.
Forelimb ending in a thorn.
Midtarsus without comb.
Midcoxal merum not angulate.
No friction-scales.
TEMNORIPAIS
Like Temnora, but end-segment of antenna short.
No friction-scales
DARAPSA
Like Ampeloeca, but tibiæ spinose.
AMPELOECA.
Similar to Ampelophaga
Head crested.
Eye lashed.
Midtarsus without comb.
Friction-scales small and numerous.
Tongue-case of pupa not compressed
Larva tapering in front; no eye-spot
CIZARA
Like Euptunaga.
Eye strongly lashed.
No friction-scales.
Larva cylindrical, tapering in front
Antenna not clubbed
Tibiæ not spinose.
BERUTANA
Like Ampelophaga, but head obviously crested, eye slightly lashed; spurs and pulvillus reduced, paronychium with one lobe at each side
RETHERA
Head slightly crested.
Eye slightly lashed.
Antenna clubbed; end-segment not prolonged.
Midtarsal segment without comb
Merum of mideoxa not angulate
Friction-scales rather small
Pulvillus and paronychium absent.
Antenna clubbed.
GIGANTEOPALPUS.
Like Eurypteryx
Palpus enlarged
Abdominal spines weaker
Midcoxal merum not angulate.
Friction-scales numerous.
TEMNORA AND PSEUDENYO
Head crested.
Eye lashed.
Antenna feebly clubbed in ♂, distinctly in ♀; end-segment long, rough-scaled.
Abdominal spines not strong, all elongate.
Merum of mideoxa somewhat angulate or not.
Tail of ♂ truncate, of ♀ conical.
Midtarsus with comb
Friction-scales large.
Larva as in Macroglossum
Pupa with somewhat compressed tongue-case.
PANACRA.
Antenna setiform in ♂, slightly clubbed in ♀; end-segment elongate-conical, with long bristles as in Chœrocampinæ
Midcoxal merum not angulate.
Abdominal spines weak.
Midtarsus with comb
Spurs of midtarsus almost equal in length.
Friction-scales large or small.
No fan-tail
Tongue-case somewhat compressed.
Larva tapering in front, eye-spot on fourth somite
HYPAEDALIA.
Eye lashed
Antenna setiform; end-segment short.
Abdominal spines weak
Merum of mideoxa not angulate
Midtarsus with comb.
Friction-scales numerous, rather small
Ventral margin of hindwing dilated.
ENPINANGA.
Like Inguana; but eye, palpus, spurs, midtarsal comb and first protarsal segment reduced.
ELIBIA.
Like Ampelophaga, but palpus enlarged; tarsi prolonged
Segments 3 and 4 of larva swollen; a dorsal eye-patch; horn of last stage vestigial.
AMPELOPHAGA.
Head feebly crested.
Antennæ not clubbed; end-segment short
Midcoxal merum not carinate.
Abdominal spines weak
Midtarsus with comb.
Friction-scales large.
No fan-tail.
Larva with swollen somites 3 and 4, no eye-spots.
Pupal tongue not compressed.
DAHIRA
Like Ampelophaga
Head crested.
Spurs reduced, midtibial ones equal
EURYPTERYX.
Eye slightly lashed
Head feebly crested
Antenna setiform, end-segment short.
Abdominal spines rather strong
Merum of mideoxa angulate.
Fan-tail in ♂.
Friction-scales slender
Midtarsus with comb
ANTINEPHELE
Eye lashed.
Antenna setiform, end-segment short
Spines of abdomen weak
Merum of mideoxa not angulate.
Midtarsus with comb.
Friction-scales large
ANGONYX.
Antenna setiform; end-segment short
Merum of mideoxa not carinate.
Spines of abdomen elongate, not strong
Midtarsus with comb.
Friction-scales large.
PHROMIS.
Like Daphnis, but end-segment of antenna with long bristles, without scales
Larva with a series of eight eye-spots
PHILODILA.
Antenna faintly clubbed (♀); end-segment long, with very long bristles.
Merum of mideoxa not angulate
Spines of abdomen rather stiff, elongate.
Midtarsus with comb.
(Midtarsal spurs equal in length.)
Eye lashed.
Midcoxal merum not angulate.
Midtarsus with comb.
Tail of ♂ three-cornered, of ♀ simple.
Friction-scales large.
Larva (young) cylindrical, with long horn; later tapering in front, with short horn.
Pupa with large compressed tongue-case.
End-segment of antenna not Chœrocampid.
End-segment of antenna Chœrocampid.
Eye lashed.
Midcoxal merum angulate
Eye not lashed
Midcoxal merum not angulate
End-segment of antenna short.
End-segment of antenna long.
NEPHELE
Eye not distinctly lashed.
Antenna setiform in ♂, feebly clubbed in ♀, end-segment long.
Merum of mideoxa subangulate.
Abdominal spines elongate, strong
Midtarsus with comb.
(Shorter terminal spurs with comb).
Tail of ♂ three-cornered, of ♀ simple.
Friction-scales large.
Larva (young) cylindrical, with long horn; later tapering in front, with short horn.
Pupa with large compressed tongue-case.
MAASSENIA
Like Nephele.
End-segment of antenna much shorter, not filiform
Spurs without comb.
ACOSMERYX.
Eye not lashed.
Antenna setiform; end-segment long.
Abdominal spines elongate.
Midcoxal merum not angulate.
Midtarsus with comb.
Friction-scales large.
No triangular tail.
Larva (adult) strongly tapering in front.
Tongue-case of pupa somewhat compressed.
DEILEPHILA
Antenna setiform in ♂, feebly clobbed in ♀; end-segment long.
Eye not lashed
Midcoxal merum subcarinate.
Abdominal spines weak
Midtarsus with comb.
Friction-scales large.
No fan-tail.
Tongue-case of pupa compressed.
Larva with somites 3 and 4 swollen, with lateral eye-spot.
(ANCESTRAL FORM)
Eye not lashed.
Antenna setiform; end-segment long.
Abdominal spines not uniseriate, strong.
Midcoxal merum not angulate.
Friction-scales small and numerous.
Midtarsus with comb.
Larva cylindrical, tapering in front.
Tongue-case of pupa somewhat compressed.
PHILAMPELICAE.
NEPHELICAE.
SESTINAE.
PHILAMPELINAE.
CHOEROCAMPINAE.
SPHINGIDAE ASEMANOPHORAE.
SPHINGIDAE MEMANOPHORAE.
SPHINGIDAE.

abdomen the first segment is mostly closely appressed to the thorax; in *Macroglossum* the first tergite is reduced to a very narrow strip. The fan-tail is found in both sexes of a number of genera, sometimes only in the ♂ (*Eurypteryx*); it is a Sesiad character indicated occasionally only by three small tufts (*Nephele* ♂♂). The scent-organ of the anterior coxa is sometimes strongly developed (*Chromis*). The mid- and hindcoxal merum are in the greater number of genera simple, or the midcoxal merum is simply carinate or subangulate; but the large sharp tooth found in *Sesia* and allies appears also in this tribe (*Macroglossum* and allies), though the hindcoxal merum is never as strongly produced as in *Sesia*.

The tibiae become spinose in several genera; the apical thorn of the foretibia found in some *Cephonodes* (*Sesiinae*) and in many *Sphingidae asemanophorae* appears also here, with or without an additional armature of spines (*Odontosida*; *Proserpinus*; *Arctonotus*; etc.). The midtarsal comb is very often lost respectively reduced. The spurs may be long or short, unequal or equal in length; in the latter case they are reduced. The proximal pair of the hindtibia is lost only in *Microsphinx*. The pulvillus and paronychium are rarely lost. The mid- and hindtarsus of *Macroglossum* and allies is specialised in being compressed and having acquired a dense spination on the outer surface.

The ancestral antenna was doubtless spiniform, long, and had an elongate rough-scaled end-segment. The clubbed antenna is a later acquisition. The short end-segment found in numerous genera is a reduced long one, *i.e.* is a less generalised character than the long segment. The length of the latter may become exaggerated, as is the case in *Acosmeryx*. The strongly clubbed antenna has a long or a short end-segment. The bristles of the end-segment are sometimes much prolonged, and resemble those of the *Choerocampinae* (*Panacra*; see also *Philodila*)

The pupa with compressed tongue-case (Choerocampid tongue-case) is a derivation from an anteriorly cylindrical and obtuse pupa as found in *Philampelicae*. On the other hand, the Choerocampid pupa of *Nephelicae* may become reduced, assuming the aspect of the pupa of *Sesiinae* by losing the compressed projecting tongue-case. Such Sesiad pupae appear frequently in genera with reduced head and tongue of the imago (*Deïdamia*, *Darapsa*, etc.).

The pedigree inserted below gives expression to our view of the connection between the various genera. There are three main branches: one leading from *Deilephila* to *Darapsa*; the second from *Nephele* to *Rhopalopsyche*; the third from *Nephele* to *Deïdamia*. We thought at first that this last branch might be a development from the first. But on consideration of all characters we think to be correct in treating the third branch (on the left side in the pedigree) as a derivation from some such form as *Nephele* instead of *Deilephila*. The qualifying remark applied to the former pedigrees holds good also here.

Key to the genera:

a. Spines of first row of abdominal tergites not longer than broad . . . . *b*.
Spines of first row of abdominal tergites longer than broad . . . . *c*.

b. End-segment of antenna elongate, ♂-antenna with fasciculated ciliae Cl. *Macroglossum*.
End-segment of antenna elongate, ♂-antenna similar to those of ♀, without prolonged ciliae . . Cl. *Rhopalopsyche*.

End-segment of antenna short : abdomen with white belt . . CLII. *Leucostrophus.*

c. Foretibia armed with thorn at end, or spinose . . . . . *d.*

Foretibia simple . . . . . *i.*

d. Costal margin of hindwing deeply sinuate . . . . . CXXXV. *Gurelca.*

Costal margin of hindwing not sinuate . . . . . *e.*

e. Two pairs of hindtibial spurs ; pulvillus absent . . . . *f.*

Two pairs of hindtibial spurs ; pulvillus present . . . . *g.*

One pair of hindtibial spurs : pulvillus present . . . . CXXXVII. *Microsphinx.*

f. Antenna clubbed . . . . CXLVIII. *Euproserpinus.*

Antenna not clubbed . . . CXLV. *Arctonotus.*

g. Foretibia not spinose, ending in a thorn . . . . . CXXXIV. *Odontosida.*

Foretibia spinose ; midtibial spurs equal . . . . . CXXXVI. *Sphingonaepiopsis.*

Foretibia spinose ; midtibial spurs not equal . . . . . *h.*

h. Antenna clubbed . . . . CXLVII. *Proserpinus.*

Antenna setiform ; abdominal spines weak . . . . . CXXII. *Darapsa.*

Antenna setiform ; abdominal spines strong . . . . . CXLVI. *Amphion.*

i. Pulvillus and paronychium absent . CXXVII. *Rethera.*

Pulvillus and paronychium present . . . *j.*

j. End-segment of antenna elongate, more or less long, filiform . . . . *k.*

End-segment of antenna short. . . . *r.*

k. Shorter mid- and hindtibial spurs with comb of bristles . . . CXXX. *Nephele.*

Shorter mid- and hindtibial spurs without comb of bristles . . . . *l.*

l. Distal margin of forewing scalloped or angulate or dentate . . . . *m.*

Distal margin of forewing even . . . *o.*

m. End-segment of antenna not scaled, with a number of very long bristles . . . . . CXXIV. *Panacra.*

End-segment of antenna scaled . . . *n.*

n. End-segment of antenna not filiform CXXIX. *Maassenia.*

End-segment of antenna long, filiform ; eye lashed . . . CXXXI. *Temnora.*

End-segment of antenna very long, filiform ; eye not lashed . . CXXIII. *Acosmeryx.*

o. End-segment of antenna not scaled, with very long bristles; midtibial spurs unequal . . . . . CXIV. *Chromis.*

End-segment of antenna scaled, with very long bristles; midtibial spurs equal . . . . . CXVI. *Philodila.*

End-segment of antenna scaled; midtibial spurs unequal, or forewing irregular . . . . *p.*

p. Spines of sternites very strong, scarcely less strong than in *Macroglossum* . . . . . CXLIX. *Atemnora.*

Spines of sternites not strong . . . . *q.*

q. Eye lashed; forewing even or dentate, angulate at R^3 . . CXXXI. *Temnora.*

Eye lashed; forewing angulate at R^2, then even . . . . CXXXII. *Pseudenyo.*

Eye not lashed . . . . CXV. *Deilephila.*

r. Eye strongly lashed and spines of abdominal sternites strong . . . . . *s.*

Not so . . . . . *t.*

s. Forewing entire . . . . CXLII. *Rhodosoma.*

Forewing with irregular distal margin . . . . . CXLIII. *Sphecodina.*

t. Costal margin of hindwing dilated . . . . *u.*

Costal margin of hindwing not dilated . . . . . *v.*

u. Costal margin of hindwing dilated into an antemedian lobe . . CXXXIX. *Giganteopalpus.*

Dilatation of margin not restricted to an antemedian lobe . . . CXLI. *Hypaedalia.*

v. Midtibial spurs equal or nearly equal in length, very short, little longer than the tibia is broad. . . . . *w.*

Midtibial spurs unequal, longer one at least twice as long as the tibia is broad . . . . . *x.*

w. Longer terminal spur of hindtibia not longer than the tibia is broad; forewing strongly falcate . . CXVII. *Dahira.*

Forewing angulate or strongly convex behind middle; a straight creamy band across forewing . CXXVIII. *Cizara.*

Forewing convex behind middle, or denticulate; antenna shorter than cell of forewing; no pale band across forewing . . . . CXXVI. *Enpinanga.*

Like previous, head with high crest; antenna longer . . . . CXXI. *Ampelocera.*

x. Long terminal spur of hindtibia at least half the length of the first tarsal segment, which is shorter than the first midtarsal segment . CXXV. *Augonyx*.

Spur shorter; or first hindtarsal segment longer than first midtarsal one . . . . . *y*.

y. Abdomen with sharply marked pale mesial line . . . . . *z*.

Abdomen without sharply marked pale mesial line . . . . . *b'*.

z. Palpus and eye large; hindtarsus twice the length of the cell of the hindwing; first hindtarsal segment longer than tibia . . CXX. *Elibia*.

Not so . . . . . *a'*.

a'. Longer spur of midtibia about half the length of the first tarsal segment; Old World . . . CXVIII. *Ampelophaga*.

Longer spur of midtibia about one-third the length of the first tarsal segment; New World . . CXXI. *Ampelocca*.

b'. Distal margin of forewing very irregular . . . . . CXLIV. *Deïdamia*.

Distal margin of forewing even or denticulate . . . . . *c'*.

c'. Forewing obviously dentate or scalloped . . . . . *d'*.

Forewing even . . . . . *e'*.

d'. Forewing with silvery angle-shaped stigma . . . . . CXXIX. *Maassenia*.

Forewing without silvery angle-shaped stigma . . . . CXIX. *Berutana*.

e'. Paronychium with one pair of lobes . . . . . CXIX. *Berutana*.

Paronychium with two pairs of lobes . . . . . *f'*.

f'. Merum of midcoxa angulate . . CXXXVIII. *Eurypteryx*.

Merum of midcoxa not angulate . . . *g'*.

g'. Hindwing sharply angulate at SM^2; longer terminal spur of hindtibia scarcely longer than the tibia is broad . . . . . CXXI. *Ampelocca*.

Anal angle of hindwing obtuse; terminal spur about half the length of the first tarsal segment; forewing somewhat angulate in middle; comb of hindtarsus vestigial . . . . . CXXXIII. *Temnoripais*.

Anal angle of hindwing very obtuse; spur as before; forewing not angulate; mid- and hindtarsus with prominent combs . . CXL. *Antinephele*.

CXIV. CHROMIS.—Typus: *erotus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* ii. p. 12 (1777).
Chromis Hübner, *Verz. bek. Schm.* p. 138 (1822) (type: *erotus*).
Deilephila, Boisduval (*non* Laspeyres, 1809), in *Voy. Astrolabe, Lép.* p. 185 (1832).
Chaerocampa, Walker (*non* Duponchel, 1835), *List Lep. Ins. B. M.* viii. p. 146 (1856).
Darapsa id., *l.c.* p. 186 (1856) (partim).
Gnathothlibus Wallengren, *Wien. Ent. Mon.* iv. p. 43 (1860) (type: *erotus*).
Theretra, Kirby, *Cat. Lep. Het.* i. p. 659 (1892).

♂ ♀. Close to *Deilephila*, but end-segment of antenna with very long bristles and without scales, the bristles several times as long as the segment, which resembles the *Theretra*-segment, but is longer. Genal process more sharply triangular than in *Deilephila*. Hindtarsus very long, reaching beyond tip of abdomen when the leg is straightened out.

Larva with a series of eight ocelli.

Pupa similar to that of *Deilephila*; cremaster bifid, each process again divided into two horizontal, conical, and pointed processes, the external ones ending again in two hooks, of which one curves ventrad, the other dorsad (Pl. LXIV. f. 18); tongue-case carinate.

Hab. Oriental Region.

Two species, which are structurally so dissimilar in several respects that they might be treated as representing two genera.

Key to the species:

Forewing crossed by straight lines; mesonotum with two yellow spots in front . . . . 425. *Ch. helioides*.
Lines of forewing curved, indistinct; mesonotum without yellow spots . . . . . 424. *Ch. erotus*.

424. Chromis erotus.

Sphinx erotus Cramer, *Pap. Exot.* ii. p. 12. t. 104. f. B (1777) (hab.?); Goeze, *Ent. Beytr.* iii. 2. p. 223. n. 72 (1780); Fabr., *Spec. Ins.* ii. p. 145. n. 24 (1781); id., *Mant. Ins.* ii. p. 95. n. 27 (1787); Gmel., *Syst. Nat.* i. 5. p. 2379. n. 69 (1790); Fabr., *Ent. Syst.* iii. 1 p. 365. n. 28 (1793); Turt., *Syst. Nat.* iii. 2. p. 172 (1806); Prillw., *Stett. Ent. Zeit.* xxxii. p. 241 (1871).
Chromis erotus, Hübner, *Verz. bek. Schm.* p. 138. n. 1479 (1822).
Chaerocampa erotus, Coles & Swinh., *Cat. Moths Ind.* i. p. 20. n. 107 (1887) (Australia); Druce, *Proc. Zool. Soc. Lond.* p. 220. n. 4 (1888) (Fiji; = *andamanensis* = *eras* = *erotoides*); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 94. n. 145 (1892) (= *andamanensis* = *erotoides*; Andamans; Australia; Solomons).

♂ ♀. Eye large. Antenna clubbed in both sexes, more distinctly in ♀ than in ♂. Foretarsus (except distal segments) and foretibia broad in ♂; scent-organ of forecoxa very strongly developed. First segment of hindtarsus longer than tibia, and in ♂ a little longer than segments 2 and 3 together, in ♀ as long as segments 2 to 5. In colour individually variable; the ♀ ♀ from the Indo-Malayan Subregion constantly different from the ♀ ♀ from the Papuan Subregion.

♂. Tenth tergite peculiar (Pl. XLIV. f. 21): strongly compressed, hooked,

dilated dorsad at the curvature ; sternite nearly like that of *Deilephila nerii* in lateral and ventral aspect. Clasper with more than twelve friction-scales, which are pointed ; harpe ending in a long and pointed hook (Pl. XLVIII. f. 28). Penis-sheath (Pl. LIV. f. 24) produced apically into a blunt process directed distad, bearing at the right side a non-dentate projection pointing proximad, and at the left side a short process ending in some teeth.

♀. Eighth tergite feebly chitinised mesially, sinuate. Vaginal plate membranaceous, except rounded-triangular postvaginal part : orifice large, without special armature.

Larva brown or green ; horn long and straight in first stages, simply curved in later stages ; eight eye-spots of equal size from third to tenth segments, all with white centre, which is surrounded by a blue (in green form) or green (in brown form) ring ; a pale line from fourth ocellus to eleventh segment ; sides below this line pale in brown form ; pale oblique ventro-lateral bands, the first beginning ventrally on fourth segment and extending backwards to the fourth eye-spot (described from drawings by Miss Barnard).

Pupa with a series of black stigmatical spots ; cremaster see above.

Hab. Oriental Region : Ceylon to Tahiti.

Two subspecies :

a. Ch. erotus erotus.

Sphinx erotus Cramer, *l.c.*

Chromis erotus, Hübner, *l.c.*

Choerocampa erotus, Cram., var. *andamanensis* Kirby, *Trans. Ent. Soc. Lond.* p. 212 (1877) (Andamans).

Chaerocampa erotus, Snellen, *Tijdschr. Ent.* xxii. t. 66. n. 14 (1877) (S. Celebes).

Chaerocampa andamanensis, Waterhouse, *Aid Ident. Ins.* ii. t. 141. f. 1 (1884).

Theretra erotus var. e. *Choer. erotus*, var. *andamanensis* Kirby, *Cat. Lep. Het.* i. p. 659. n. 113 (1892).

♂♀. Underside less reddish than in the Papuan form, though not in all specimens ; marginal band of hindwing broad in ♀, dark cinnamon-rufous proximally.

Hab. Southern and eastern parts of the Indo-Malayan Subregion.

In the Tring Museum 20 specimens from : Ceylon ; Andamans ; Nicobars ; Sarawak (Pryer) ; Mt. Gede, Java ; Toli-Toli, N. Celebes, Nov. Dec. 1895 (Fruhstorfer) ; Tambora, Sambawa, 2500—4000 feet, June 1896 (W. Doherty) ; Sumba.

b. Ch. erotus eras.

**Deilephila eras* Boisduval, in *Voy. Astrolabe, Lép.* p. 185. n. 4 (1832) (Tahiti ;—coll. Charles Oberthür) ; Feisth., in Guér., *Mag. Zool.* ix. *Ins.* t. 21. f. 2 (1839) ; id., in *Voy. Favorite, Zool. Lép.* p. 19. t. 5. f. 2 (1839).

Chaerocampa erotus, Walker, *List Lep. Ins. B. M.* viii. p. 146. n. 34 (1856) (Australia; Navigator I.); Koch, *Indo-Austr. Lep. Fauna* p. 53 (1865) (= *sapor* = *croüdes*) ; id., *Stett. Ent. Zeit.* xxxii. p. 239 (1871) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 566. n. 76 (1877) (Australia ; Solomon Is); Tepp., *Nat. Ins. S. Austr.* ii. p. 15 (188 ?) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 108. n. 208 (1888) (Amboina) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 14. n. 22 (1891) (Newcastle ; Brisbane to C. York) ; Lidg., *Transf. Aust. Lep.* p. 12 (1898) (life hist.) ; Pagenst., in Chun, *Zool.* xii. 29. p. 13. n. 8 (1900) (Ralum, viii. ; N. Lanenberg ; N. Georgia).

Darapsa eras, Walker, *l.c.* viii. p. 186. n. 2 (1856).

Gnathothlibus erotoides Wallengren, *Wien. Ent. Mon.* iv. p. 43. n. 44 (1860) (Australia) ; id., *Resa Eugenie* p. 362. t. 7. f. 4 (1864).

Choerocampa erotus, Walker, *l.c.* xxxv. p. 1852 (1866) (= *erotoides*) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 250. n. 31 (1875) (N. Caled. ; Tahiti ; Austral.).

Chaerocampa sapor Koch, *Stett. Ent. Zeit.* xxxii. p. 239 (1871) (Australia).

Chaerocampa eroides (!), id. *l.c.* xxxii. p 240 (1871).
Chaerocampa erotus var. *sapor*, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 250 sub n. 31 (1875).
Chaerocampa erotoides, Butler, *l.c.* ix. p. 566. n. 77 (1877) (Australia ; Navigator I.).
Chaerocampa eras, id., *l.c.* n. 78 (1877) ; Swinh., *Cat. Lep. Het. Mus. Oc.* i. p. 22. n. 84 (1892) (Sydney).
Theretra erotus, Kirby, *Cat. Lep. Het.* i. p. 659. n. 113 (1892).
Theretra erotus var. a. *Gnathothlibus erotoides*, Kirby, *l.c.*
Theretra erotus var. b. *Deil. eras*, Kirby, *l.c.*

♂ ♀. Underside generally more reddish tawny than in the western form ; marginal band of hindwing narrow in ♀, individually variable in width, never so broad as in western ♀ ♀.

Hab. Papuan Subregion : Moluccas and Tenimber Islands eastwards to Tahiti.

In the Tring Museum 3 pupae, 120-odd specimens from : Guam, ix.—xi. ; German N. Guinea ; Ron I., Dutch N. Guinea, vii. (Doherty) ; Milne Bay, Brit. N. G. (Meek) ; Louisiades; Trobriand and d'Entrecasteaux Is. (Meek), i. iii. iv. x. ; Florida, Guadalcanar, Isabel, and Kulambangra, Solomon Is. (Meek) ; New Hanover (Webster) ; Lifu ; Apia, Upolu (Woodford).

425. **Chromis heliodes.**

Deilephila heliodes Meyrick, *Trans. Ent. Soc. Lond.* p. 456 (1889) (N. Guinea).
Theretra heliodes, Kirby, *Cat. Lep. Het.* i. p. 659. n. 114 (1892).
**Theretra alberti* Rothschild, Nov. Zool. ii. p. 162. t. 9. f. 9 (♂) (1895) (Fergusson I.;—Mus. Tring).

♂ ♀. Antenna much slenderer than in *erotus*, not incrassate distally. Foretarsus of ♂ normal, scent-organ of forecoxa vestigial ; first segment of hindtarsus in both sexes as long as segments 2 to 5 together. Distal margin of forewing straight ; hinder angle far less obtuse than in *erotus*. Mesonotum with a yellow spot in front on each side.

♂. Tenth tergite as strongly compressed as in *erotus*, but not dilated before end, being sabre-shaped ; sternite broader than in the preceding, apex evenly rounded. Harpe as in *erotus*. Penis-sheath (Pl. LIV. f. 25) with the two processes found in *Deilephila nerii*, but both short.

♀. Vaginal plate more evenly rounded distally than in *erotus*.

Early stages not known.

Hab. Papuan Subregion.

In the Tring Museum 2 ♂♂, 2 ♀♀ from : Fergusson I., d'Entrecasteaux Islands, ix. x. 1894 (A. S. Meek) ; Aroa R., Brit. N. Guinea (Weiske) ; Bongu, Huon Golfe, and Stephansort, German N. Guinea.

CXV. DEILEPHILA.—Typus : *nerii*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1856) (partim).
Spectrum Scopoli, *Intr. Hist. Nat.* iii. p. 413 (1777) (partim).
Deilephila Laspeyres, *Jenaische Allg. Literatur-Zeit.* iv. p. 99 (1809) (partim ; type : *nerii*).
Elpenor Oken, *Lehrb. Nat.* iii. 1. p. 760 (1815) (partim ; type : *nerii*).
Daphnis Hübner, *Verz. bek. Schm.* p. 134 (1822) (partim ; type : *cacus* = *megacacus*).
Chaerocampa Duponchel, in God., *Lep. France, Suppl.* ii. p. 159 (1835) (partim ; type : *nerii*).
Metopsilus Duncan, in Jardine, *Nat. Libr.* xl. p. 154 (1836, 1843) (partim ; type : *nerii*).
Darapsa Walker, *List Lep. Ins. B. M.* viii. p. 182 (1856) (partim).
Chaerocampa (!), Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. p. 92 (1857).

♂ ♀. Genal process triangular, obtuse, shorter than pilifer. Head broad, somewhat crested transversely on occiput. Eye large, not lashed. Palpus obtuse, large. Antenna ♂ setiform, heavier than in *Acosmeryx*, somewhat clubbed in ♀ ;

hook rather abrupt and short, subserriate in lateral aspect, end-segment prolonged into a long filiform process. Spines of abdomen in several rows, elongate, weak; first tergite large, olive-green. Hinder edge of midcoxal merum subcariniform. Tibiae simple; spurs very unequal, long terminal one of hindtibia much longer than second tarsal segment; midtarsus with comb, the spines of which are, however, not much prolonged. Wings entire, apex of forewing pointed; R^2 of hindwing before centre of cell.

♂. Tenth segment simple, tergite (Pl. XLIV. f. 18. 19) not or little narrowed to end, convex above at end and concave below; sternite (Pl. XLIV. f. 19. 20) elongate-triangular, sides sometimes nearly parallel (in dorsal aspect), apex more or less pointed, upperside concave, transversely ribbed or tuberculate at end. Clasper with less than ten large friction-scales, rounded-dilated dorsally; harpe (Pl. XLVIII. f. 16—21) with two processes, one proximal, the other distal, both dorsal. Penis-sheath with one or two left processes, and a longer right process. (Pl. LV. f. 27—33).

♀. Vaginal plate suddenly narrowed at end (Pl. XLI. f. 14), here concave, the apical margin raised and somewhat projecting ventrad.

Larva tapering in front; a pale dorso-lateral stripe ending at horn; third segment with ocellus in some species; horn long and curved twice in first stages, shorter and simply curved in later stages.—Food-plants: *Nerium*; *Vinca*; *Cinchona*; etc.

Pupa clayish brown, with a lateral series of black stigmatal spots; head-case not enlarged, tongue not projecting; sheaths of wings, legs and tongue smooth; dorsum densely but finely shagreened, venter more transversely striate; abdominal segments 5 and 6 with a basal lateral space of sharp, short, transverse keels; cremaster bifid at extreme end.

Hab. Aethiopian and Oriental Region, one species extending northward far into the Palaearctic Region.

Seven species.

Key to the species:

a. Green discal area of forewing above externally deeply excised between R^2 and R^3, the sinus more or less filled in with white	426.	*D. dohertyi.*
Green discal area without that sinus		*b.*
b. Pale apical line of forewing widened to a spot close to apex		*c.*
Pale apical line of forewing simple		*d.*
c. Green subbasal area of forewing above externally sinuate at SC	429.	*D. lagardi.*
Green subbasal area of forewing above externally not sinuate	428.	*D. hypothous.*
d. Distal marginal area of forewing below chestnut, strongly contrasting with rest of wing	432.	*D. protrudens.*
Distal marginal area of forewing below not chestnut		*e.*
e. Abdomen with pale subbasal belt above		*f.*
Abdomen without pale subbasal belt above	431.	*D. minima.*

f. Tegulae, subbasal band of forewing, etc., bright olive-green . . . . . 427. *D. nerii*.
Tegulae, subbasal band of forewing, etc., blackish or brownish olive-green . . 430. *D. placida*.

426. Deilephila dohertyi.

**Daphnis dohertyi* Rothschild, Nov. Zool. iii. p. 307. n. 2 (1897) (Kapaur, Dutch N. G.;—Mus. Tring); Pagenst., in Chun, *Zoologica* xii. 29. p. 242. fig. (1900).
Daphnis hypothous, id. *l.c.* p. 14. n 12 (1900) (N. Pommern).

♂♀. A very remarkable species, differing from the others in the green area of the forewing being externally deeply incised between R^2 and R^3, while it is as broad between R^3 and M^1 as between R^1 and R^2, a green oblong patch R^3—M^1 being merged together with the band; the white spot at base and that at apex heavy; antemedian line irregular, distinct only in and near cell. Collar green, first two abdominal tergites green.

♂. Tenth tergite rounded at end; sternite tapering, apex obtusely pointed. Large scales of clasper black at midrib and edges; harpe (Pl. XLVIII. f. 18) peculiar, the discal process produced into a long finger, which is slightly twisted at the end, proximal process narrow, outline of dorsal margin of clasper somewhat undulate. Penis-sheath (Pl. LV. f. 33) with *two* left processes, one pointing proximad, the other dextrad, and a longer right process.

Early stages not known.

Hab. New Guinea; Bismarck Archipelago; Solomon Islands.

In the Tring Museum 4 ♂♂, 2 ♀♀ from: Kapaur, Dutch N. Guinea, xii. '96 (Doherty), *type*; Bongu, Huon Golfe; Kinigunang, N. Pommerania (Ribbe); N. Mecklenburg (Ribbe); Kulambangra, Solomon Is., 25. ii. 1901 (Meek and Eichhorn); Isabel, Solomon Is., 4. vi. to 9. vii. 1901 (Meek and Eichhorn).

427. Deilephila nerii.

Frisch, *Insect.* vii. p. 5. t. 3 (*l.*, *p.*, *i.*) (1722); Rösel, *Ins. Belust.* iii. p. 85. t. 15. f. 1. 2. 3., t. 16. f. 4. 5. 6 (1755); Hemm., *Coll. Cur. Ins.* t. 4. f. a. b. (*l.*, *i.*) (175–?); Schäff., *Icon. Ratisb.* t. 100. f. 3. 4 (1766–69); Ern. & Engr., *Pap. Eur.* iii. p. 77. t. 104. f. 153. a—f. (1782).
Sphinx nerii Linné, *Syst. Nat.* ed. x. p. 490. n. 5 (1758); id., *l.c.* ed. xii. p. 798. n. 5. (1767); Hufn., *Berl. Mag.* ii. 2. p. 176. n. 2, p. 191. n. 2 (1766); Beckm., *Epit.* p. 160. n. 4 (1767); Müll., *Naturs.* v. 1. p. 636. n. 5 (1774); Fabr., *Syst. Ent.* p. 538. n. 5. (1775); Den. & Schiff., *Verz. Schm. Wien* p. 42 (1776); Beckm., *Phys. Ök. Bibl.* v. p. 156 (1774); Mad., ed. Kleem., *Raupenkal.* p. 63. n. 178, p. 80. n. 129 (1777); Cram., *Pap. Exot.* iii. p. 51. t. 224. f. D (1779) (Coromandel); Esp., *Schmett.* ii. p. 43. t. 4. f. 1. 2. 3, p. 199. t. 27. f. 1. 2 (1779); Blum., *Handb. Nat.* p. 364. n. 2 (1780); Goeze, *Ent. Beytr.* iii. 2. p. 145. n. 5 (1780); Fabr., *Spec. Ins.* ii. p. 142. n. 11 (1781); Fuessl., *N. Mag.* ii. p. 371 (1785); Fabr., *Mant. Ins.* ii. p. 93. n. 12 (1787); Borkh., *Eur. Schm.* ii. p. 74. n. 138, p. 178. n. 5 (1789); Gmel., *Syst. Nat.* i. 5. p. 2374. n. 5 (1790); View., *Verz. Brand.* i. p. 4. n. 4 (1790); Rossi, *Fauna Etr.* ii. p. 162. n. 1052. tab. (1790) (life hist.); Brahm, *Ins. Kal.* p. 524. n. 383 (1791); Schwarz, *Raupenkal.* p. 196. 350. 500 (1791); Fabr., *Ent. Syst.* iii. 1. p. 360. n. 13 (1793); Hübn., *Eur. Schm., Sphing.* p. 95. t. 11. f. 63 (1795); id., *Gesch. Eur. Schm.* ii. *Sphing. Lep. B.* ua f. 1. a. b (180–?); Fabr., in Illig., *Mag. Ins.* vi p. 288 (1807); Ochs., *Schm. Eur.* ii. p. 201. n. 1 (1808); Nagel, *Hülfsb. Schm.* p. 149 (1818); Latr., *Nouv. Dict. Hist. Nat.* xxii. p. 27 (1819); God., *Hist. Nat. Lép. France* iii. p. 12. n. 1. t. 13 (1821); Lep. & Serv., *Enc. Méth.* x. p. 466. t. 63. f. 5–8 (1825); Meig., *Handb. Schm.* i. p. 93 (1827); id., *Syst. Beschr. Schm.* ii. p. 132. n. 1. t. 63. f. 3 (1830); Beske, in Silberm., *Rev. Ent.* ii. p. 177. (1834) (Hamburg); Friv., *ibid.* ii. p. 181 (1834) (Hungary); Thon, *Nat. Schm.* p. 104. t. 52. f. 725. 726. 727 (1837); Brullé, *Exp. Morea, Artic.* p. 286. n. 603 (1832); Luc., *Lép. Eur.* p. 110. t. 42 (1834); Blanch., *Hist. Nat. Ins.* iii. t. 20. f. 1 (1840); Treitschke, *Hülfsb.* p. 162. n. 5 (1844); Keferst., *Wien. Ent. Mon.* ii. p. 225 (1858);

Speyer, *Stett. Ent. Zeit.* xxx. p. 234 (1869) (gynandr. specim.) ; Brutt., *Progr. Gymn. Dorpat* p. 24. n. 9 (1872) (vi. vii.) ; Breuk., *Tijdschr. Ent.* xv. *Versl.* p. 59 (1872).

Deilephila nerii, Laspeyres, *Jenaische Allg. Lit.-Zeit.* iv. p. 90 (1809) ; Ochsenh., *Schm. Eur.* iv. p. 43. n. 1 (1816) ; Boisd., *Ind. Meth.* p. 32 (1829) (Pedem. ; Gall. m.) ; id., *Faune Mad. Bourb.* p. 74 (1833) (Maur. ; Bourb. ; Madag.) ; Cant., in Silberm., *Rev. Ent.* i. p. 77 (1833) (Dépt. Var) ; Dup., *Bull. Soc. Ent. France* p. 64 (1835) (Amiens) ; Dorm., *ibid.* (1835) (Epernay) ; Lepell., *ibid.* p. 73 (1835) (Paris) ; Dorm., *Ann. Soc. Ent. France* p. 363 (1836) (nord de la Fr., grand nombre de chen.) ; Ducell., *Bull. Soc. Ent. France* p. 9 (1839) ; Grav., *ibid.* p. 45 (1837) ; Pierr., *ibid.* p. 64 (1835) (Gisors) ; Blanch., *Hist. Nat. Ins.* iii. p. 479. n. 3 (1840) ; Boisd. & Pierr., *Bull. Soc. Ent. France* p. 104 (1846) ; Pierr , *ibid.* p. 113 (1846) ; Bruand, *ibid.* p. 54 (1847) ; Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847) ; Pierr., *l.c.* p. 75 (1849) (Paris) ; Fairm., *ibid.* p. 76 (1849) (Abbéville) : Blanch., in Orb., *Dict. Hist. Nat.* xi. p. 756. *Atlas Lép.* t. 16. f. 2 (1849) ; Ghil., *Bull. Soc. Ent. France* p. 70 (1850) (Piémont) ; Douz., *Ann. Soc. Ent. France* p. 225 (1850) (indigénité) ; Boisd., *Bull. Soc. Ent. France* p. 74 (1851) ; Luc., *ibid.* p. 51 (1852) (St. Germ.-en-Laye) ; id., *l.c.* 73 (1852) (Paris ; Epernay) : id., in Chenu, *Enc. Hist. Nat., Pap.* i. p. 263. fig. 465. 466. 467 (*l., p., i.*) (1853) ; Bruand, *Bull. Soc. Ent. France* p 18 (1858) (Besançon ; Mühlhausen) ; Wilde, *Ramp.* ii. p. 82. t. 9. f. 74 (1860) ; Czeg., *Sitz. Ber. Zool. Bot. Ges. Wien* x. p. 18 (1860) ; Stand. & Wocke, *Cat. Lep.* p. 16. n. 22 (1861) ; Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Künk., *Bull. Soc. Ent. France* p. 62 (1867) (Aisne) ; Gav., *Tijdschr. Ent.* x. p. 197. n. 75 a (1867) (Groningen) ; Snell., *Vlind. Ned.* p. 93. n. 1 (1867) ; Kawall, *Berl. Ent. Zeitschr.* xi. p. 193 (1867) ; Tengstr., *Act. Soc. F. F. Fenn.* x. p. 6 (1869) ; Stand. & Wocke, *Cat. Lep.* id. ii. p. 37. n. 479 (1871) ; Siebke, *En. Ins. Norv.* iii. p. 24. n. 4 (1874) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 45 (1880) ; Rom., *Mém. Lép.* i. p. 71 (1884) (Borjoum, vii. ; *l.* on *Vinca major*) ; Lampa, *Ent. Tidskr.* vi. p. 27. n. 118 (1885) : id., *l.c.* l. p. 115 (1885) (Gotland) ; Fallou, *Bull. Soc. Ent. France* p. 226 (1885) (Paris) : Amel., *Berl. Ent. Zeitschr.* xxxi. p. 261 (1887) (Dessau) : Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889) ; Hom., *Raup. Grossschm.* p. 30. t. 8. f. 3 (1893) ; id., *Grossschm.* p. 30. n. 13. t. 18. f. 2 (1894) ; Kill. & Cafl., *Jahrb. Nat. Ges. Graub.* xxxviii. *App.* p. 20 (1895) ; Schaus & Clem., *Sierra Leone Lep.* p. 18 (1893) ; Holtz, *Illustr. Zeitschr. Ent.* ii. p. 63 (1897) (Cilicia, viii.) ; Schulz, *ibid.* ii. p. 393 (1897) (gynandr. specim.) ; Bartel, in Rühl, *Grossschm.* ii. p. 133 (1900) ("Java" *ex err.*).

Elpenor nerii, Oken, *Lehrb. Naturg.* iii. 1. p. 760. n. 1 (1815).

Sphynx (!) *nerii*, Vogel, *Schmett.-Cab.* ii. p. 16. t. 5. f. 1. a, b. (1822).

Daphnis nerii, Hübner, *Verz. bek. Schm.* p. 134. n. 1441 (1822) ; Steph., *Cat. Brit. Ins.* ii. p. 29 (1829) ; Curt., *Illustr. Brit. Ent.* xiv. t. 626 (1837) ; Walk , *List Lep. Ins. B. M.* viii. p. 188. n. 1 (1856) (Italy ; Athens : S. Leone ; Canara ; Natal ; *non* Ceylon, = *hypothous*) ; Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 272. n. 628. t. 10. f. 3. 3a (*l., p.*) (1857) (Dukhun ; Madras) ; id., *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 572. n. 1 (1877) (Italy ; Athens ; Canara ; Mauritius ; Natal) ; Plötz, *Stett. Ent. Zeit.* xli. p. 76. n. 282 (1881) ; Butl., *Proc. Zool. Soc. Lond.* p. 613 (1881) (Kurachi, iii.—v.) ; Moore, *Lep. Ceylon* ii. p. 14. t. 82. f. 1. 1a (*l., i*) (1882) ; Fors., *Trans. Ent. Soc. Lond.* p. 390 (1884) ; Butl., *l.c.* p. 494. n. 47 (1884) (Aden) ; Swinh , *Proc. Zool. Soc. Lond.* p. 513. n. 2 (1884) (Kurachi, larva on leaves of wild oleander, on flowers of double garden-oleander ; three broods apparently) ; id., *l.c.* p. 288. n. 9 (1885) (Poona, iv. xi. ; Bombay, viii.—xi. ; larva on *Taberna montana*) ; id., *l.c.* p. 435. n. 10 (1886) (Mhow, ix.) ; Cot. & Swinh.. *Cat. Moths Ind.* i. p. 21. n. 112 (1887) (South India ; Calcutta ; Sikhim) ; Druce, in Moloney, *West Afr. Forestry* p. 493. n. 8 (1887) ; Swinh., *Journ. Bombay N. H. Soc.* iii. p. 119. n. 11 (1888) (Kurachi, iii.—v.) ; Holl., *Trans. Amer. Ent. Soc.* xvi. p. 64. n. 20 (1889) (Kangwe : Benita) ; Karsch, *Ent. Nachr.* xvii. p. 295. n. 8 (1891) (Cameroons) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 23. n. 87 (1892) ; Kirby, *Cat. Lep. Het.* i. p. 671. n. 1 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 94. n. 146. f. 54 (♀) (1892) ; Joann., *Ann. Soc. Ent. France* p. 432. n. 25 (1894) (Mahé, Seych.) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 415. n. 146 (1898) ("not seen") ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 100. n. 733 (1901).

Metopsilus nerii, Duncan, *Brit. Moths* t. 9 (1836).

Chaerocampa nerii, Duponchel, in God., *Lép. France, Suppl.* ii. p. 160 (1835) (Piémont ; France mérid. : Paris) ; Westw. & Humphr., *Brit. Moths* p. 21. t. 5. f. 1. 2. 3 (1843) ; Bond, *Proc. Ent. Soc. Lond.* (3). i. p. 92 (1862) ; Kent, *Zoolog.* xx. p. 8172 (1862) ; Guen., in Vins., *Voy. Madag.* p. 30 (1865) ; Bow., *Entom.* iv. p. 162 (1869) ; Enock, *Ent. Mo. Mag.* vii. p. 41. (1870) ; id., *Entom.* v. p. 144 (1870) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 224. n. 1 (1875) ; Fry, *Trans. Watford N. H. Soc.* i. p. 174 (1878) ; Porr., *Ent. Mo. Mag.* xiv. p. 41 (1878) ; Vins., *Pap. Bourbon* p. 13 (1891).

Chaerocampa (!) *nerii*, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. *Suppl.* p. 92. n. 1525 (1857) (Gall. mer. ; Odessa) ; Ramb., *Lép. Andal.* p. 132 (1858) ; Mab., *Ann. Soc. Ent. France* p. 298 (1879) (Madag.) ; Barrett, *Lep. Brit. Ins.* ii. p. 62. n. 4. t. 53. f. 1. a. b. c (1895).
Daphnis nerii var. *infernelutea* Saalmüller, *Lep. Mad.* p. 123. n. 294 (1884) (Madag.) ; Kirby, *Cat. Lep. Het.* i. p. 672. sub n. 1 (1892).

♂♀. First segment of posterior tarsus considerably longer than the tibia and than segments 2 to 5, long apical spur of hindtibia as long as segments 2 and 3 together.

♂. Tenth tergite (Pl. XLIV. f. 18. 19) long, rather strongly curved, apex rounded-truncate ; sternite (Pl. XLIV. f. 19. 20) much shorter than tergite, broad, somewhat rounded at the sides, narrowed from middle to apex, which is pointed. Clasper rather strongly dilated dorsally before apex ; large scales somewhat spotted with brown at and before end ; harpe (Pl. XLVIII. f. 16) : basal process prominent, apical process obtuse, densely dentate on the upper surface. Penis-sheath (Pl. LV. f. 28, as seen from the right side) : apical margin dorsally produced into a rounded lobe which bears the left process ; this process short, triangular, pointing proximad ; the right process horizontal, shorter than in the allied species.

♀. Vaginal plate (Pl. XLI. f. 1) regularly folded distally of mouth of vagina, the edges of the latter raised, much wrinkled, a semicircular, antevaginal ridge rather prominent.

Larva green, with a large ocellus on third segment in adult stage, the ocellus smaller in young larva ; a white dorso-lateral line from fourth segment to horn, accompanied by white dots ; anterior segments generally pale ; horn long in early stages, becoming short and stumpy later on.—Food-plants : *Nerium ; Vinca ; Taberna.*

Pupa clayish brown, about five times as long as broad ; a series of more or less rounded black spots in which the stigmata are situated, a black mesial line on thorax, and minute black dots on thorax and abdomen ; cremaster black, conical, ending in two short points ; visible part of profemur very small.

Hab. Aethiopian Region inclusive of Malagassic Subregion, eastward to Ceylon North India, Caucasia ; northward as a wanderer to the northern parts of the temperate zone.

Fresh specimens are purer green than worn ones. The green colour fades easily into yellow.

In the Tring Museum 4 larvae, 3 pupae, 70-odd specimens from : various places in Europe ; Beirut, Syria ; Sierra Leone, southward to Cape of Good Hope, eastwards to Abyssinia ; N.W. India ; S. India ; Ceylon ; Sikhim.

428. Deilephila hypothous.

Sphinx hypothous Cramer, *Pap. Exot.* iii. p. 165. t. 285. f. D (1780) (Amboina).
Daphnis hippothous (!), Hübner, *Verz. bek. Schm.* p. 134. n. 1410 (1822).

♂♀. Antenna thicker than in *nerii*, especially in ♂. First segment of hindtarsus as long as tibia and as segments 2 to 5. In pattern similar to *nerii*, but very much darker olive-green ; pronotum not green ; forewing with a white apical spot above and below, the white apical line SC^1—SC^5, which borders the olive-green triangular patch, not prolonged beyond SC^5 as in *nerii*.

♂. Tenth tergite shorter and broader than in *nerii* ; sternite nearly as long as the tergite, more strongly chitinised and narrower than in *nerii*. Large scales

of clasper brown or black on midrib and at edge; harpe (Pl. XLVIII. f. 17) shorter than in the other species of the genus, *layardi* excepted, distal margin angulated, upper margin somewhat flattened, with two rows of teeth (only one row visible in side-view). Penis-sheath (Pl. LV. f. 27) armed with two slender processes: the left horizontal, the right obliquely curved towards the ventral side.

♀. The distal portion of the vaginal plate nearly smooth; the chitinised halfring-shaped plate in front of the vaginal aperture not raised to a carina or ridge.

Larva green (or red), with small ocellus on third segment, a pale dorso-lateral line from head to horn; the latter granulose, curved, rather long (much longer than in adult *nerii*).—Food-plant: *Cinchona*.

Pupa less slender than in *nerii*, lateral spots of abdomen larger on segments 3 and 4; cremaster elongate-triangular, deeply biconcave ventrally, being carinate mesially; apex truncate, with the angles produced dorsad and laterad each into a prominent tooth.

Hab. Oriental Region, from Ceylon and North India eastwards to the Solomon Islands.

Two subspecies:

a. D. hypothous hypothous.

Sphinx hypothous Cramer, *l.c.*

Daphnis hippothous (!), Hübner, *l.c.* (1822).

Daphnis nerii, Walker, *List Lep. Ins. B. M.* viii. p. 188. n. 1 (1856) (partim: Ceylon).

Darapsa hypothous, id., *l.c.* viii. p. 185. n. 6. (1856) (Java; partim); Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 271. n. 627. t. 10. f. 2. 2a (*l.*, *p.*) (1857) (partim; Java); id., *Proc. Zool. Soc. Lond.* p. 676 (1867) (Calcutta; *l.* & *p.* mentioned).

Choerocampa hypothous, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 226. n. 3 (1875) (Moluccas; Philippines; Java); Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 105. n. 199 (1888) (Amboina); Piep., *Tijdschr. Ent.* xl. p. 98. t. 1. f. 21. 22 (horn of *l.*), p. 100. t. 2. f. 6. 7 (larva) (1897) (Java).

Daphnis hypothous, Butler, *Trans. Zool. Soc. Lond.* ix. p. 572. n. 2 (1877) (Ceylon; Java; Labuan; Sarawak); Moore, *Lep. Ceylon* ii. p. 15. t. 8. 3. f. 1. 1a (*l.*, *p.*, *i.*) (1882) (various stages of larva); Cot. & Swinh., *Cat. Moths Ind.* i. p. 21. n. 113 (1887) (Sikhim; Sibsager; Calcutta; Ceylon; Andamans); iid., *l.c.* p. 727. n. 113 (1889) (Andamans); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 23. n. 88 (1892) (Assam; Nepaul; Ceylon; Amboina); Kirby, *Cat. Lep. Het.* i. p. 672. n. 2 (1892); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 95. n. 147 (1892) (India; Ceylon; Java; Borneo); Huwe, *Berl. Ent. Zeitschr.* xl. p. 366. n. 34 (1895) (Java); Semp., *Schm. Philipp.* ii. p. 401. n 42 (1896) (Cebu, vii.—ix., xii.—xiii.; Palawan); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 415. n. 147 (1898) (Sikhim, Bhutan, up to 6000 ft.; larva on *Cinchona* acc. to Elwes).

Otus hypothous, Snellen, *Tijdschr. Ent.* xx. p. 2. n. 11 (1877) (Java).

♂♀. The interspace M^1—M^2 of the upperside of the forewing outside the olive-green area more or less greyish, the triangular projection M^2—SM^2 of the green area bordered by a fine white line, the rhomboidal green spot near anal angle also with a white line at the innerside. Left process of penis-sheath long (Pl. LV. f. 27), reaching the base of the right process.

Hab. Ceylon to North India, eastwards to the Moluccas and the Tenimber and Key Islands.

In the Tring Museum 50 ♂♂, 18 ♀♀ from: Ceylon; Sikhim; Perak; Penang; Sumatra; Borneo; Java; Sumba; Celebes; Amboina; Sjerra (= Seira) and Larat, Tenimber Is.; Little Key.

The individual (♀) from Sjerra has the white lines of the forewing and the buffish band of the hindwing prominently marked.

b. D. hypothous pallescens.

**Daphnis pallescens* Butler, *Proc. Zool. Soc. Lond.* p. 6. n. 19. (1875) (Queensland ;—Mus. Brit.) : id., *Trans. Zool. Soc. Lond.* ix. p. 572. n. 3 (1877) (Queensland) ; Kirby, *Cat. Lep. Het.* i. p. 672. n. 4 (1892) (Queensland) ; Rothsch., Nov. Zool. i. p. 85 (1894) (= *magnifica*).

**Daphnis magnifica* Butler, *Ann. Mag. N. H.* (4). xix. p. 461 (1877) (Rockhampton ;—Mus. Brit.); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 24. n. 89 (1892) (N. Guinea) ; Kirby, *Cat. Lep. Het.* i. p. 672. n. 3 (1892) (Rockhampton).

Daphnis hypothous, Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 19. n. 33 (1891) (partim).

**Daphnis gloriosa* Rothschild, Nov. Zool. i. p. 85 (1894) ("N. Borneo" *err. loci* ;—Mus. Tring) ; id., *l.c.* ii. t. 8. f. 8 (1895) ; Pagenst., in Chun, *Zoologica* xii. 29. p. 15. n. 13 (1900) (Ralum, ii. ; N. Meckl.).

♂ ♀. The interspace M^1—M^2 of the upperside of the forewing outside the green area nearly as dark as this area itself; no white lines behind M^2 ; the border C^1—R^3 of the green area less white than in the western subspecies ; the two lines between the subbasal band and the antemedian olive-green line not distinct ; buff band of the hindwing on the whole broader than in *h. hypothous*. Left process of penis-sheath shorter than in the preceding, not reaching the base of the right one.

In some of the Queensland individuals the base of the hindwing above is more extended buff than in ordinary specimens, and the under surface is also much less red.

Hab. Queensland : New Guinea ; Bismarck Archipelago ; Solomon Islands.

In the Tring Museum 39 ♂♂, 12 ♀♀ from : Queensland ; New Guinea : Bongu, Huon Golfe, Milne Bay, xi. i. ii. (Meek) ; Fergusson, ix.—xii. (Meek); St. Aignan, xi. (Meek); N. Mecklenburg (Ribbe); Kulambangra, Solomon Is., ii. (Meek and Eichhorn).

It is worthy of special note that the Moluccas and the Key Islands are inhabited by the Indo-Malayan and not by the Papuan form.

429. Deilephila layardi.

**Daphnis layardi* Moore, *Lep. Ceylon* ii. p. 16. t. 84. f. 1 (♂) (1882) (Ceylon ; -Mus. Brit.) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 22. n. 117 (1887) ; Kirby, *Cat. Lep. Het.* i. p. 672. n. 5 (1892) (Ceylon) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 96. n. 149 (1892) (Ceylon).

♂ ♀. Subbasal band of forewing, above, broader than the interspace between it and the dark discal area ; antemedian line distinct only in front, almost touching at M^2 the olivaceous line which runs parallel with the outer edge of the subbasal band ; proximal edge of discal area straight ; a white dot at apex of forewing above and below.

♂. Sexual armature similar to that of *hypothous*, but the harpe smaller (Pl. XLVIII. f. 19).

Early stages not known.

Hab. Ceylon.

In the Tring Museum 6 ♂♂.

430. Deilephila placida.

Darapsa hypothous, Walker (*non* Cramer, 1780), *List Lep. Ins. B. M.* viii. p. 185. n. 6 (1856) (partim); Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 272. n. 628 (1857) (partim ; Java).

**Darapsa placida* Walker, *l.c.* p. 186. n. 8 (1856) (Sumatra ;—Mus. Oxford).

♂ ♀. Antemedian line of forewing above midway between subbasal and discal bands ; the latter band not wider between M^1 and M^2 than at hinder margin,

externally rounded or angled at R^2, the most distal point on R^2, *not* on R^3, no white apical spot above or below; the costal portion of the subbasal band often reduced.

♂. Tenth segment as in *hypothous*. Large scales of clasper rather strongly rounded at the sides; clasper not strongly dilated dorsally, apex rounded; harpe (Pl. XLVIII. f. 20) longer than in any of the preceding species, not or feebly dentate, the teeth especially often developed at the hinder edge of the upper margin, shape of the two processes rather variable individually. Penis-sheath (Pl. LV. f. 30) with a short left process, which is often dentate, the proximal edge of the incrassate apex of the sheath also dentate, the right process long, oblique, curved ventrad, more or less dentate at end.

♀. Vaginal plate without semicircular ridge proximally of the vaginal aperture.

Larva with a pale dorso-lateral stripe from pronotum to horn, a pale line on anal segment; stigmata orange; horn tubercled, longer than anal segment, curved. —Food-plant: *Taberna montana*.

Pupa tawny-ochraceous, spotted with black on abdomen, slenderer than that of *hypothous*, cremaster almost identical.

Hab. Andaman Islands, Singapore, eastward to Fiji; not in India?

Two subspecies, individually rather variable.

a. D. placida placida.

Darapsa hypothous, Walker, *l.c.*

**Darapsa placida* Walker, *l.c.*

**Daphnis angustans* Felder, *Reise Novara, Lep.* t. 76. f. 6 (1874) (Moluccas;—Mus. Tring); Butl., *Trans. Zool. Soc. Lond.* ix. p. 572. n. 5 (1877): Kirby, *Trans. Ent. Soc. Lond.* p. 236 (1877) (Brisbane); Pagenst., *Jahrb. Nass. Ver. Nat.* xliii. p. 101. n. 180 (1890) (E. Java, v.); Kirby, *Cat. Lep. Het.* i. p. 672. n. 8 (1892) (Amboina; Australia); Semp., *Schm. Philipp.* ii. p. 401. n. 43. t. v. f. 10. 11 (*l., p.*) (1896) (Luzon; Cebu; Mindanao).

Choerocampa angustans, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 228. n. 4 (1875); Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 106. n. 200 (1888) (Amboina).

**Choerocampa hesperus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 228. n. 5 (1875) (Philippines;—coll. Charles Oberthür).

**Daphnis horsfieldi* Butler, *Trans. Zool. Soc. Lond.* ix. p. 572. n. 6 (1877) (Java;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 672. n. 9 (1892) (Java); Huwe, *Berl. Ent. Zeitschr.* xl. p. 366. n. 35 (1895) (Java).

**Daphnis andamana* Druce, *Ent. Mo. Mag.* xix. p. 16 (1882) (Andamans;—coll. Druce); Cot. & Swinh., *Cat. Moths Ind.* i. p. 22. n. 116 (1887); Pagenst., *Iris* iii. p. 2. n. 3 (1890) (Palawan); Kirby, *Cat. Lep. Het.* i. p. 672. n. 10 (1892) (Andamans); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 96. n. 148 (1892) (Andamans); Semp., *Schm. Philipp.* ii. p. 401. n. 44 (1896) (Palawan).

Daphnis placida, Butler, *Trans. Zool. Soc. Lond.* ix. p. 573. n. 8 (1877); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 24. n. 90. t. 1. f. 8 (1892) (Sumatra, *type*; Singapore; "India!")

Daphnis hypothous, Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 19. n. 33 (1891) (partim).

Daphnis hesperus, Butler, *l.c.* p. 631 (1877); Kirby, *Cat. Lep. Het.* i. p. 672. n. 6 (1892) (Philippines).

Daphnis (?) placida, Kirby, *Cat. Lep. Het.* i. p. 672. n. 13 (1892) (Sumatra).

♂♀. Proximal edge of olive-green discal area of forewing, above, deeply incurved in front; antemedian line distinct.

Larva: see above.

Hab. Andamans, Singapore, Sumatra, Philippines, eastwards to the New Hebrides.

In the Tring Museum 80-odd specimens from: Andamans; Java; Lombok; Sambawa; Sumba; Amboina; Key Is.; N. Guinea; Queensland; Guadalcanar and Florida, Solomon Is. (Meek and Eichhorn); N. Hebrides.

b. D. placida torenia.

**Daphnis torenia* Druce, *Ent. Mo. Mag.* xix. p. 16 (1882) (Fiji ;—coll. Druce); Waterh., *Aid Ident. Ins.* ii. t. 126. f. 1 (1883) ; Kirby, *Cat. Lep. Het.* i. p. 672. n. 11 (1892).
**Daphnis torenia* Druce subsp. *rosacea* Rothschild, Nov. Zool. i. p. 85 (1894) (Lifu ;—Mus. Tring).

♂ ♀. Proximal edge of olive-green discal area of forewing straight, very feebly or not at all incurved in front ; antemedian line quite absent or barely visible.

Hab. Lifu ; Fiji.

In the Tring Museum 3 ♂♂, 4 ♀♀ from Lifu.

431. Deilephila minima.

**Daphnis minima* Butler, *Trans. Zool. Soc. Lond.* ix. p. 573. n. 7. t. 92. f. 5 (1877) (S. India ;—Mus. Brit.) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 21. n. 114 (1887).
Daphnis (?) minima, Kirby, *Cat. Lep. Het.* i. p. 672. n. 12 (1892) (S. India).
Daphnis minimus, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 97. n. 152 (1892) (S. India).

♂. A small species, representing *placida* in South India and Ceylon, and doubtfully distinct. Abdomen without white subbasal dorsal belt.——Forewing : antemedian line curved in front ; discal band less oblique than in *placida*, wider behind and narrower before middle.——Sexual armature as in *placida*, but proximal tooth of the boat-shaped process of the harpe higher, and the long process of the penis-sheath of *placida* represented in *minima* by a very short one (Pl. LV. f. 31, 32).

Larva described by Butler, *l.c.*

Hab. South India and Ceylon.

Two subspecies ; but see Appendix.

a. D. minima minima.

**Daphnis minima* Butler, *l.c.*

♂. Very small and pale. Discal lines of forewing not obviously dentate. Process of penis-sheath in one of the two specimens dissected longer (Pl. LV. f. 32) than in the other.

Hab. South India.

Two ♂♂ in the British Museum.

b. D. minima ernestina.

**Daphnis ernestina* Moore, *Lep. Ceylon* iii. p. 534. t. 211. f. 1 (1887) (Pundoloya, December ;—Mus. Brit.) ; Kirby, *Cat. Lep. Het.* i. p. 672. n. 15 (1892) (Ceylon) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 96. n. 150 (1892) (Pundoloya, Ceylon).

♂. Larger than the preceding, darker in colour, especially the hindwing above and the basi-discal area of the forewing below. Process of penis-sheath shorter (Pl. LV. f. 31).

Hab. Ceylon.

Two ♂♂ in the British Museum. Another specimen in coll. Druce.

432. Deilephila protrudens.

**Daphnis protrudens* Felder, *Reise Novara Lep.* t. 76. f. 7 (1874) (Gilolo ;—Mus. Tring) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 572. n. 4 (1877) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 20. n. 34 (1891) (Brisbane ; Rockhampton ; Cardwell ; Halmeira [?] ; "Cape of Good Hope [?]" *err. loci*) ; Kirby, *Cat. Lep. Het.* i. p. 672. n. 7 (1892) (Gilolo) ; Pagenst., in Chun, *Zoologica* xii. 29. p. 15. n. 14 (1900) (Bismarck Archipelago).
Chærocampa protrudens, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 225 n. 2 (1875) (Halmahera).
Chærocampa neriastri Boisduval, *l.c.*

♂♀. This species is easily distinguished from all the others by the marginal area of the forewing below, bordered by the pale, oblique, discal line, being chocolate-brown. The discal area of the upperside of the forewing is not sharply defined proximally ; it extends often, in front and behind, to the sharply marked, straight, antemedian line, externally it is much produced between R^2 and R^3, the most distal point lying between the two veins ; no white apical dot above or below ; the brown discal area of the hindwing reduced in size and depth of tint.

♂. Tenth segment as in *placida*, sternite rather slender, sides almost parallel, rounded at end, tip obtusely pointed. Harpe (Pl. XLVIII. f. 21) with long distal process, not dentate. Penis-sheath (Pl. LV. f. 29) with a short left process and a very long right one, the left process differing from that of *placida* especially in not being dentate.

Early stages not known.

Hab. Papuan Subregion : Moluccas to Queensland, the Bismarck Archipelago, and the Solomon Islands.

In the Tring Museum 3 ♂♂, 8 ♀♀ from : Queensland ; Gilolo ; Tugela, Solomon Islands (Woodford).

CXVI. PHILODILA gen nov.—Typus : *astyanor*.

Everyx Boisduval, *Spec. Gén. Lép. Hét.* i. p. 208 (1875) (partim ; type : *myron*).

♀. Pilifer long ; genal process narrow and long. Palpus large, rather slenderer than in *Deilephila*. Eye large, not lashed. Antenna slender, faintly incrassate distally, with slender hook ; end-segment long, with three very long apical bristles ; last but one segment conically produced ventrally. Spines of abdomen numerous, rather stiff, pale tawny. Legs wanting except one middle leg, which has, however, only three tarsal segments left ; midtibial spurs *equal* in length, about twice as long as the tibia is broad at end ; midtarsus with prominent comb. Apex of forewing produced, distal margin obtusely angulate at R^2 ; lower angle of cell of hindwing about 75° ; SC^2 and R^1 stalked, R^2 before centre of cell, D^4 longer than D^2, and longer than in *Deilephila*.

Early stages not known.

Hab. ? Probably Oriental Region.

One species.

Differs from *Deilephila* and *Ampelophaga* in the midtibial spurs being equal in length, etc.

433. **Philodila astyanor** (Pl. VI. f. 3, ♀).

**Everyx astyanor* Boisduval, *l.c.* p. 211. n. 3 (1875) (Mexique ?) ; Kirby, *Cat. Lep. Het.* i. p. 673. n. 4 (1892).

♀. *Upperside* : see figure.

Underside very much paler ; wings with a brown distal border, which is indented at the veins on the forewing ; between this band and the subcostal fork there are on the forewing two brown parallel bars extending from costal margin to R^1 ; the border of the hindwing gradually narrows from R^2 backwards.

Hab. ?

The only specimen known (in coll. Charles Oberthür) is labelled "Mexique ?" We believe it to be Oriental.

CXVII. DAHIRA.—Typus : *rubiginosa*.

Dahira Moore, *Proc. Zool. Soc. Lond.* p. 390 (1888) (type : *rubiginosa*).
Ambulyx, Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* vii. p. 2 (1889).

♂. Genal process large, triangular, curved backwards. Head with mesial cariniform crest, which is most distinct between antennae. Eye lashed. Palpus rounded, somewhat projecting. Antenna fusiform, narrowed at base, gradually fining to a slender hook, strongly compressed, fasciculated ciliae long; end-segment *short*. Spines of abdomen weak. Midcoxal merum somewhat angulate. Tibiae unarmed; spurs *short*, midtibial ones equal in length, long terminal one of hindtibia shorter than the tibia is broad; no comb; pulvillus and paronychium not reduced. Wings entire; forewing elongate, subfalcate, apex acute; cross-veins of hindwing slightly oblique, D^3 longer than D^4.

♂. Tenth tergite elongate, convex above, concave beneath, apex entire; sternite nearly as long as the tergite, broader, triangular, extreme tip sinuate. Clasper sole-shaped; with large friction-scales, irregularly arranged in four rows, besides some additional enlarged scales, extreme tip of these scales truncate; harpe (Pl. IL. f. 6) produced into a long ventral process, which is spatulate and somewhat twisted. Penis-sheath (Pl. LIV. f. 30) with a long dentate and curved process at the right side, ending in two points, and a much shorter, also dentate, lobe at the left side.

♀ and early stages not known.

Hab. N.W. India.

One species.

Allied to *Ampelophaga*.

434. Dahira rubiginosa.

**Dahira rubiginosa* Moore, *Proc. Zool. Soc. Lond.* p. 391 (1888) (Mundi, N.W. Himal. ;—Mus. Brit.) ; Cot. & Swinh., *Cat. Moths Ind.* p. 726. n. 61. A (1889) ; Kirby, *Cat. Lep. Het.* i. p. 662. n. 1 (1892).
Ambulyx rubiginosa, Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* vii. p. 2 (1889) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 78. n. 105 (1892).
Ambulyx rubrescens Butler, *l.c.* p. 26. t. 121. f. 2 (1889) (nom. nov. loco *rubiginosa*).

♂. In wing-form reminding one of *Oxyambulyx*, with which it has erroneously been associated by Butler and Hampson.

Hab. N.W. India.

Only one specimen known, which is in the British Museum.

CXVIII. AMPELOPHAGA.—Typus : *rubiginosa*.

Deilephila, Walker (*non* Laspeyres, 1809), *List Lep. Ins. B. M.* viii. p. 163 (1856) (partim).
Chaerocampa, Ménétriés (*non* Duponchel, 1835), *Enum. Corp. Anim. Mus. Petr., Lep. Suppl.* ii. p. 91 (1857).
Elibia, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 178 (1875).
Ampelophaga Bremer & Grey, in Motsch., *Et. Ent.* i. p. 61 (1852) (*nom. indescr.*) ; Butl., *Papilio* i. p. 104 (1881) (typus : *rubiginosa*).
Acosmeryx, Holland (*non* Boisduval, 1875), *Trans. Amer. Ent. Soc.* xvi. p. 71 (1889).
Deilephila (*Ampelophaga*), Staudinger, in Rom., *Mém. Lép.* iii. p. 230 (1892).

♂♀. Genal process triangular. Palpus rather long, rounded in lateral and dorsal aspect, closely appressed to head. Eye not lashed. Head with the scaling a little raised to a rounded crest. Antenna very slender, filiform, gradually fining distally, hook very gradual, end-segment short, triangular or conical, about twice the length of the previous segment. Spines of abdomen numerous, weak, pale. Mesum of midcoxa not carinate behind; tibiae not spinose: spurs very unequal, longer ones over half the length of the first tarsal segment, this as long as the four other segments together, and a little shorter than the tibia; midtarsus with comb of more or less prolonged spines; pulvillus present, large; paronychium with two pairs of lobes. Wings entire.

♂. Friction-scales of clasper large. Tenth segment simple. Clasper sole-shaped; harpe spatulate, dilated part dentate on upperside, or reduced, without process. Penis-sheath with a right and a left apical process, the left one always dentate at the edges.

♀. Eighth tergite sinuate. Vaginal plate suddenly narrowed as in *Deilephila*; orifice large, free, edges slightly raised.

Larva (of *rubiginosa*), tapering in front, head small, horn slightly curved; a pale dorso-lateral line from horn forward, pale oblique side-bands connected with this line.—Food-plant: *Vitis*; *Ampelopsis*; *Convolvulus*.

Pupa (of *rubiginosa*), stout, rounded at both ends, cremaster apparently thin.

Hab. Japan and Amurland southward to North India and the Philippines; not yet known from the Sunda Islands.

Four species.

The name *Ampelophaga* appeared first in 1852. Bremer & Grey, when describing "*Ampelophaga*" *rubiginosa*, did not give any generic distinctions, nor did they even mention that *Ampelophaga* was meant to be a new generic term. They were again entirely silent on these points in 1854, *l.c.*, so that we believe they did not mean to create a new term, but intended to write *Philampelus*, a name then employed for a variety of species, especially for American vine-feeders. However that may be, *Ampelophaga* remained a *nomen indescriptum* up to 1881, when Butler gave a kind of definition, and dates therefore from that time.

The genera *Ampelophaga*, *Berutana*, *Ampeloeca*, and *Darapsa* are very closely allied with one another, agreeing especially in the antenna being slender and having a short end-segment. The caterpillars are also almost the same; the peculiar dentition of the harpe of some of the species, and the armature of the penis-sheath point in the same direction. The affinities are so strong that we were at first inclined to unite these forms under one generic term (*Darapsa*). However, the American species on the one side and the Eastern ones on the other form two distinct groups; these two groups are natural ones, *i.e.* the differences express closer blood-relationship of the respective members, as the morphical distinctions are corroborated by the geographical distribution, and therefore we have to treat the groups as genera. Within the Old World as well as in the New World group there is one species more specialised than the others, showing the same kind of specialisation so often observed among the *Acherontiinae* and especially the *Ambulicinae*, namely the appearance of spines on the tibia (*pholus*) and the reduction of the paronychium and acquisition of dentate wings (*syriaca*). To emphasise this development, and (as said below) to facilitate the construction of a satisfactory key to the genera—generally a weak point in systematic works—we treat these specialised forms also as generically distinct.

Close to these insects comes the large Oriental *Elibia dolichus*, which might very well be considered generically identical with the other species mentioned, if all these were treated as being generically the same.

Key to the species :

a.	Forewing with sharply marked, parallel, greyish white lines at nearly eqnal distances between base and outer margin . . .	*c.*
	Forewing with brown bands, which are often barely vestigial, interspaces sometimes shaded with white scaling; no sharply marked greyish white lines	*b.*
b.	Underside of abdomen and hindwing bright rufous-testaceous	436. *A. khasiana.*
	Underside of abdomen and hindwing salmon-buff or clayish	435. *A. rubiginosa.*
c.	Hindwing, above, blackish-brown . . .	437. *A. dolichoides.*
	Hindwing, above, glaucous-blue in basal area (as in *E. dolichus*)	438. *A. linigera.*

435. Ampelophaga rubiginosa.

Ampelophaga rubiginosa Bremer & Grey, in Motsch., *Et. Ent.* i. p. 61 (1852).

♂♀. No comb to mid- and hindtarsns. R^2 and R^3 of hindwing much farther apart than R^3 and M^1.——Forewing, above, with an indistinct basal band, a subbasal line, an antemedian band, an abbreviated disco-cellular band, followed by a broad discal one, a discal line, mostly dentate, and an oblique apical line, more or less indistinctly continued, in zigzag form, to hinder margin ; interspaces greyish, distal marginal area glossy ; all these lines and bands sometimes quite indistinct.

♂. Tenth sternite truncate, feebly sinuate in distal view. Harpe (Pl. XLVIII. f. 15) rather regularly ladle-shaped. Penis-sheath (Pl. LIV. f. 23) : long left process irregularly and sparsely dentate and notched at the proximal edge ; the short right process mostly simple, but sometimes with one or two minute teeth.

Larva : see above.

Hab. Japan to North India.

Two subspecies :

a. A. rubiginosa rubiginosa.

Ampelophaga rubiginosa Bremer & Grey, *l.c.* ; iid., *Schm. Nördl. China's* p. 11. n. 52 (1853) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 546. n. 1. t. 91. f. 4. 5 (*l., p.*) (1877) (Pekin ; Japan) ; Staud., in Rom., *Mém. Lép.* iii. p. 158 (1887) (= *romanori*) ; Leech, *Proc. Zool. Soc. Lond.* p. 583. n. 10 (1888) (Oiwake ; Yokohama) ; id., *Trans. Ent. Soc. Lond.* p. 119. n. 93 (1889) (Kiukiang) ; Kirby, *Cat. Lep. Het.* i. p. 673. n. 1 (1892 (China ; Japan) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 10. n. 40 (1892) (Shantung, China) ; Leech, *Trans. Ent. Soc. Lond.* p. 281. n. 46 (1898) (Yokohama ; Oiwake ; Kiukiang ; Ichang) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 100. n. 732 (1901).

Deilephila rubiginosa, Walker, *List Lep. Ins. B. M.* viii. p. 173. n. 18 (1856) ; Fixs., in Rom., *Mém. Lép.* iii. p. 321. n. 97 (1887) (Corea, E. vi.—B. viii.) ; Bartel, in Rühl, *Grossschm.* ii. p 137 (1900).

Chaerocampa rubiginosa, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. *Suppl.* p. 91. n. 1513. t. 12. f. 2 (1857) (Pekin) ; Oberth., *Et. Ent.* v. p. 28. n. 69bis (1880) (Askold, vii.) ; id., *Bull. Soc. Ent. France* p. 56 (1886) (vii. ; larva on *Vitis, Convolvulus*).

Elibia rubiginosa, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 178. n. 1 (1875).

**Deilephila romanovi* Staudinger, in Rom., *Mém. Lép.* iii. t. 9. f. 1 a. b (1887) (Amurland :—coll. Staudinger).

Arosmeryx ienoba Holland, *Trans. Amer. Ent. Soc.* xvi. p. 71 (1889) (Japan); Kirby, *Cat. Lep. Het.* i. p. 649. n. 5 (1892); Leech, *Trans. Ent. Soc. London* p. 282. n. 48 (1898) ("not seen").

Deilephila (*Ampelophaga*) *rubiginosa*, Staudinger, *l.c.* vi. p. 230. n. 216 (1892) (Amur).

♂ ♀. Scaling of tip of antenna buff, not black. Tawny-olive bands of forewing rather prominent. Distal margin of hindwing more or less russet, especially before anal angle. Bred specimens more reddish as a rule than worn ones.

Hab. Japan, Amurland, China.

In the Tring Museum 20 ♂♂, 26 ♀♀ from: Yokohama, iv. viii. ix.; Mukoyama, vii.; Oiwake; Hakodate, vi. vii.; Corea; Amurland; Kiukiang, vi. vii. viii.; Ta-tsien-lu, vii.; Wa-ssu-ku; Hongkong.

b. A. rubiginosa fasciosa.

**Ampelophaga fasciosa* Moore, *Proc. Zool. Soc. Lond.* p. 391 (1888) (Dharmsala;—Mus. Brit.); Butl., *Illustr. Typ. Specim. Lep. Het. B. M.* vii. p. 25. t. 121. f. 3 (1889); Cot. & Swinh., *Cat. Moths Ind.* i. p. 9. n. 49 (1887) (Kulu; Simla; Sikhim); Kirby, *Cat. Lep. Het.* i. p. 673. n. 2 (1892) (Dharmsala).

Ampelophaga rubiginosa, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 83. n. 117. f. 52 (1892) (partim; N.W. Himal.; Sikhim; Nagas; *larva exclusa*).

Ampelophaga harterti Rothschild, *Iris* vii. p. 299. n. 9 (1894) (Margherita, Assam;—coll. Staudinger); Hamps., *Journ. Bombay N. H. Soc.* xiii. p. 39. n. 117 (1900).

♂ ♀. Paler than the previous form, more uniform in colour, less reddish above, the bands of the more elongate forewing less distinct; fringe of hindwing almost pure white; scaling of tip of antenna blackish at anterior side.

The larva described by Hampson, bearing an ocellus on the fourth and fifth segments, belongs to *Theretra*.

Hab. North West India to Upper Assam.

In the Tring Museum 9 ♂♂, 6 ♀♀ from: Karo Hills, vii.; Dalhousie, vii.; Kulu.

436. Ampelophaga khasiana.

**Ampelophaga khasiana* Rothschild, Nov. Zool., ii. p. 482. n. 1 (1895) (Khasia Hills;—Mus. Tring).

Ampelophaga rubiginosa, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 409. n. 117 (1898) (Sikhim, vii.); Leech, *Trans. Ent. Soc. Lond.* p. 281. n. 46 (1898) (partim).

♂ ♀. *Upperside* deeper in tint, mesial line less pale and sides of body and under surface far more red than in *rubiginosa*. Scaling of end of antenna black. ——Forewing, above: interspaces between bands glossy whitish grey, discal band rather narrower and more sharply defined than in *rubiginosa*, discal line broad, not dentate, band-like. First segment of palpus not greyish white.

♂. Tenth sternite not sinuate in distal aspect. Dilated apical part of harpe longer than in *rubiginosa*, more heavily spined proximally. Right process of penis-sheath longer.

Hab. North India; China.

In the Tring Museum 3 ♂♂, 2 ♀♀ from: Khasia Hills; Jaintia Hills.

In the British Museum 1 ♀ from Mupin, coll. Leech; this is rather paler on the underside than our North Indian specimens.

437. Ampelophaga dolichoides.

**Philampelus dolichoides*, Felder, *Reise Novara, Lep.* t. 76. f. 8 (1874) (Sikhim;—Mus. Tring).

Pergesa dolichoides, Moore, *Proc. Zool. Soc. Lond.* p. 577 (1874).

Elibia dolichoides, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 180. n. 3 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 547. n. 2 (1877).
Metopsilus dolichoides, Kirby, *Cat. Lep. Het.* i. p. 661. n. 21 (1892).
Ampelophaga dolichoides, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 84. n. 118 (1892) (Sikhim) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 410. n. 118 (1898) (Sikhim, vii. viii., 1800 ft.).

♂ ♀. Midtarsus with the spines of the fourth row prolonged, but not so much as in *Elibia*. R^3 and M^1 of hindwing less close together than in the preceding species, D^3 not being longer than D^1.——Forewing with four grey lines, which are the proximal borders of tawny-olive bands ; between the two discal lines there is a feebly marked brown zigzag line.

♂. Tenth sternite sinuate in distal aspect. About sixteen large friction-scales, rounded-truncate, broad at end. Process of harpe short, not dentate. Apex of penis-sheath asymmetrical, both processes dentate.

Hab. Sikhim ; Assam.

In the Tring Museum 3 ♀♀ from : Sikhim (*type*) ; Cherrapunji. A ♂ in coll. Swinhoe from Silhet.

438. Ampelophaga linigera.

**Elibia linigera* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 180. n. 4 (1875) (Manila ;—coll. Charles Oberthür) ; Kirby, *Cat. Lep. Het.* i. p. 662. n. 2 (1892) ; Semp., *Schm. Philipp.* ii. p. 403. n. 49 (1896) ("not receiv.").

♂. Under surface far more reddish than in *dolichoides*. R^2 of hindwing before centre of cell, D^3 being much longer than D^4 ; SC^2 and R^1 on a stalk.——Forewing, above, similar to that of *dolichoides*, but lines in basal half quite indistinct, and second discal line more distal, ending at apex of wing, there being no separate oblique apical line.——Hindwing similar in colour to that of *Elibia dolichus*.

Tenth tergite long, narrow, slightly curved, not compressed ; apex truncate ; sternite compressed, boat-shaped in side-view, apex transversely ribbed above, rounded-truncate in dorsal aspect. Clasper with large friction-scales ; harpe as in *Elibia*, short, broad, obtuse, not produced into a dentate process (Pl. XLVIII. f. 11). Penis-sheath (Pl. LIV. f. 22) almost symmetrical in dorsal aspect, with a longer right and a shorter and broader left process, both dentate.

♀. Not known.

Hab. Manila, Luzon.

One ♂ (*type*) in coll. Charles Oberthür. Not seen in other collections.

This species connects *Ampelophaga* with *Elibia*.

CXIX. BERUTANA gen. nov.—Typus : *syriaca*.

Deilephila, Lederer (*non* Laspeyres, 1809), *Verh. Zool. Bot. Ges. Wien* v. p. 195 (1855).
Pergesa, Walker (*non* id., 1856) *List Lep. Ins. B. M.* xxxi. p. 32 (1861).
Everyx, Schaufuss, *Nunq. Otios.* i. p. 20 (1870) (partim ; *nom. indescr.*).
Otus, Butler (*non* Cuvier, 1800), *Trans. Zool. Soc. Lond.* ix. p. 545 (1877).
Metopsilus, Staudinger (*non* Duncan, 1836), in Staud. & Rebel, *Cat. Lep.* ed. iii. p. 104 (1901).

♂ ♀. Closely allied to *Ampelophaga*. Head more obviously crested. Eye slightly lashed. Long terminal spur of hind- and midtibia less than half the length of the first tarsal segment, which is shorter than the tibia ; no comb to midtarsus ; pulvillus small, paronychium with *one* lobe at each side. SC^2 and R^1

of hindwing shortly stalked, R^2 before centre of cell, lower angle of cell acuminate. D^4 less than half the length of D^3.

♂. Sexual armature nearly exactly the same as in *Ampelophaga rubiginosa*, the two processes of the penis-sheath thinner, not dentate.

♀. Vaginal plate very feebly chitinised, shaped as in *Ampelophaga*. Eighth tergite see Pl. XLI. f. 13.

Larva as in *Ampelophaga*, *Ampeloeca*, and *Darapsa*, strongly tapering in front; green or brown, with pale dorso-lateral line, and below this pale oblique bands.—Food-plant: *Vitis*.

Pupa dotted with brown on the wing-cases, legs, antenna, and tongue (not seen).

Hab. Syria; Mesopotamia; Persia.

One species.

439. **Berutana syriaca.**

Deilephila syriaca Lederer, *Verh. Zool. Bot. Ges. Wien* v. p. 195. t. 2. f. 9 (1855) (Beirut).

♂♀. This species bears a close resemblance to *Darapsa pholus*; the inner edge of the discal band of the forewing is, however, not straight, but concave before middle. Some individuals are much more tawny than others; there is also obvious variation in size.

Hab. Syria; Mesopotamia; Persia.

Two subspecies:

a. B. syriaca syriaca.

Deilephila syriaca Lederer, *l.c.*; Staud. & Wocke, *Cat. Lep.* p. 16. n. 21 (1861); iid., *l.c.* ed. ii. p. 37. n. 478 (1871); Bartel, in Rühl, *Grossschm.* ii. p. 139 (1900) (Beirut, E. vii. viii.).
Ecerya syriacus, Schaufuss, *Nunq. Otios.* i. p. 20 (1870).
Otus syriacus, Butler, *l.c.* p. 545. n. 1 (1877).
Chaerocampa syriaca, Weism., ed. Meldola, *Stud. Theory Desc.* p. 191. t. 9. f. 29 (1882) (larva).
Metopsilus (?) syriacus, Kirby, *Cat. Lep. Het.* i. p. 660. n. 2 (1892).
Metopsilus syriacus, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 104. n. 762 (1901) (Syr.; Palaestina: Antiochia).

♂♀. Band and lines of forewing distinct; distal margin sometimes almost even, the teeth being barely indicated. ♂ paler than ♀.

Hab. Syria.

In the Tring Museum 2 larvae, 15 ♂♂, 15 ♀♀ from Beirut.

b. B. syriaca kotschyi (Pl. VI. f. 4, ♂, *type*).

**Deilephila kotschyi* Kollar, *Denkschr. K. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 53. n. 11 (1850) (Schiraz;—Mus. Vienna).
Chaerocampa kotschyi, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 234. n. 11 (1875).
Theretra kotschyi, Kirby, *Cat Lep. Het.* i. p. 654. n. 49 (1892).
Metopsilus syriacus var. *mardina* Staudinger, in Staud. & Reb., *Cat. Lep.* ed. iii. p. 104. sub n. 762. (1901) (Mardin, Mesopotamia).

♂. Much larger than the preceding; wings not obviously denticulate. Perhaps distinct.

Hab. Persia; Mesopotamia.

CXX. ELIBIA.—Typus : *dolichus*.

Sphinx (*Choerocampa*), Westwood (*non* Linné, 1758 ; *non* Duponchel, 1835), *Cab. Or. Ent.* p. 61 (1848).

Elibia Walker, *List Lep. Ins. B. M.* viii. p. 148 (1856) (type : *dolichus*).

♂ ♀. Palpus large, rounded in side-view, third segment above frons. Eye very large, not lashed. Abdomen very long. Tarsi long, hind ones twice the length of the cell of hindwing ; first segment of hindtarsus a little longer than tibia ; comb of midtarsus very prominent, the spines much prolonged and accompanied on the hinder side by another row of slender prolonged spines. Apex of hindwing very obtuse ; SC^2 and R^1 shortly stalked.

♂. Tenth tergite slightly narrowed in middle, apex truncate, angles rounded ; sternite as long as the tergite, strongly compressed, broad vertically, ventral line strongly curved upwards in lateral aspect, apex rounded in distal view. Large friction-scales of clasper acuminate, not truncate ; harpe short (Pl. XLVIII. f. 10), represented by a rather thin ridge, which is truncate distally and feebly angulate dorsally. Penis-sheath nearly symmetrical (Pl. LIV. f. 21), both the right and left processes denticulate at the edges and on the surface, the dentition of the left process continued on the sheath.

♀. Vaginal plate as in *Ampelophaga* and *Deilephila*, but broader apically.

Larva. Three stages figured by Piepers : a round dorsal ocellus on fourth segment ; horn curved frontad in younger stages, reduced to a button-like prominence in last stage.

Hab. North India to Java and Palawan.

One species.

440. Elibia dolichus.

**Sphinx* (*Choerocampa*) *dolichus* Westwood, *Cab. Or. Ent.* p. 61. t. 30. f. 1 (1848) (Silhet ;—Mus. Oxford).

Elibia dolichus, Walker, *List Lep. Ins. B. M.* viii. p. 149. n. 1 (1856) ; Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 273. n. 631 (1857) (Silhet) ; Moore, *Proc. Zool. Soc. Lond.* p. 675 (1867) (Silhet) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 179. n. 2 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 547. n. 1 (1877) (Silhet) ; Snell., *Tijdschr. Ent.* xx. p. 67 (1877) (Sumatra) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 9. n. 50 (1887) (Sikhim ; Sibsagar ; Silhet) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 10. n. 41 (1892) (Silhet ; Singapore ; Cambodia) ; Kirby, *Cat. Lep. Het.* i. p. 662. n. 1 (1892) (Silhet) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 100. n. 159. f. 57 (♂) (1892) (Sikhim ; Assam ; Sumatra) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xlvii. p. 38 (1894) (E. Java) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 365. n. 30 (1895) (Java) ; Semp., *Schm. Philipp.* ii. p. 403. n. 48 (1896) (Palawan) ; Piep., *Tijdschr. Ent.* xl. p. 97. t. 1. f. 5. 10. 15 (horn of *l.*), p. 101. t. 4. f. 1. 2. 3 (*l.*) (1897) (Java) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 415. n. 159 (1898) (Sikhim, Bhutan, up to 4000 ft., v. xii.).

Chaerocampa dolichus, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. *Suppl.* p. 93. n. 1545 (1857).

♂ ♀. Forewing with seven lines between lower angle of cell and outer margin, first and fifth heavy, the others often weakly marked, second, third, fourth, and sixth sometimes distinctly accentuated by vein-dots ; lines between lower angle of cell and costal margin feeble, that traversing the large, black, white-centred stigma the most obvious. Abdomen white below, with ferruginous-tawny or brown mesial markings on the proximal sternites.

Hab. Sikhim to Java and Palawan.

In the Tring Museum 18 ♂♂, 8 ♀♀ from ; Sikhim ; Khasia Hills ; Penang ; Sumatra ; Java ; Bunguran, Natuna Is. (Hose) ; Borneo ; Palawan.

CXXI. AMPELOECA gen. nov.—Typus : *versicolor*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* iii. p. 91 (1779).
Otus, Hübner (*non* Cuvier, 1800), *Verz. bek. Schm.* p. 142 (1822).
Smerinthus, Serville & Lepelletier (*non* Latreille. 1805), in *Enc. Méth.* x. p. 441 (1825).
Choerocampa, Harris (*non* Duponchel, 1835), in Sillim., *Journ. Sc. Art* xxxvi. p. 301 (1839).
Darapsa Walker, *List Lep. Ins. B. M.* viii. p. 182 (1856) (partim ; type : *pholus=choerilus*).
Everyx Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. *Suppl.* p. 93 (1857) (*nom. indescr.*) ; Boisduval, *Spec. Gén. Lép. Hét.* i. p. 208 (1875) (partim ; incl. type of *Darapsa*).
Elibia, Butler (*non* Walker, 1856), *Trans. Zool. Soc. Lond.* ix. p. 637 (1877).
Ampelophaga, id., *Papilio* i. p. 104 (1881) (partim ; type : *rubiginosa*).

♂ ♀. Genal process rounded or triangular, in the latter case curved backwards. Head with high rounded crest. Eye lashed. Long terminal spur of hindtibia less than half the length of the first tarsal segment ; no comb to midtarsus. In other characters similar to *Ampelophaga*.

♂. Clasper with small and numerous friction-scales.

♀. Eighth tergite truncate ; vaginal plate nearly evenly rounded laterally and distally.

Larva strongly tapering in front ; head small and granulose like pronotum and horn, dispersed pale granules or dots all over the body ; a dorso-lateral pale line, to which are joined pale oblique side-bands.—Food-plants : *Ampelopsis ; Vitis : Epilobium ; Cephalanthus ; Nesaea ; Hydrangea*.

Pupa stout, rounded at both ends, opaque, rather finely rugose, dispersedly punctured, punctures denser and deeper on last segments ; clayish, variegated with brown ; wing-cases, legs and antenna dotted with black ; anterior femur not visible ; cremaster slender.

Hab. Atlantic district of Nearctic Region.

Two species :

Disc of wings below bright yellow externally .	441. *A. versicolor*.
Disc of wings below reddish tawny-ochraceous, concolorous with basal area	442. *A. myron*.

441. **Ampeloeca versicolor**.

Choerocampa versicolor Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 303. n. 3 (1839) ; Harr., ed. Flint, *Ins. Inj. Veg.* p. 328 (1862) ; Grey, *Canad. Ent.* xi. p. 140 (1879) (Albany, N.Y.).
Choerocampa ? versicolor, Walker, *List Lep. Ins. B. M.* viii. p. 131. n. 6 (1856) ; Boisd., *Spec. Gén. Lép. Hét.* p. 210. 284. n. 84 (1875).
Darapsa versicolor, Clemens, *Journ. Ac. N. Sc. Philad.* iv. p. 148. n. 29 (1859) ; Morris, *Cat. Lep. N. Am.* p. 19 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 169. n. 4 (1862) ; Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., vii.) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 22 (1874) ; id., *l.c.* ii. p. 225. n. 36 (1875) ; Peck, *Canad. Ent.* viii. p. 239 (1876) (Maine ; larva notic.) ; Streck., *Lep. Rhop. Het.* p. 113. t. 13. f. 9 (♂) (1876) ; id., *l.c.* p. 142 (1877) ; Dimm. & Mann, *Psyche* ii. p. 68 (1877) ; Hulst, *Canad. Ent.* x. p. 64 (1878) (life hist. ; *l.* on *Cephalanthus occid.* ; Long I.) ; Bunk., *ibid.* x. p. 211 (1878) ; Fletch., *Canad. Ent.* xv. p. 204 (1883) (on *Nesaea verticillata*) ; Fish., *ibid.* xvii. p. 78 (1885) (Buffalo, larva on *Cephalanthus occ.*) ; Kirby, *Cat. Lep. Het.* i. p. 671. n. 5 (1892).
Otus versicolor, Grote, *Proc. Ent. Soc. Philad.* v. p. 81 (1865) ; id. & Rob., *ibid.* v. p. 154. n. 32 (1865) ; Beth., *Canad. Ent.* i. p. 10 (1869) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 546. n. 4 (1877).
Elibia versicolor, Butler, *l.c.* ix. p. 637 (1877) ; Grote, *Canad. Ent.* ix. p. 120 (1877) (L. Erie) ; id., *l.c.* ix. p. 131 (1877) ; id., *Bull. Buffalo Soc. N. Sc.* iii. p. 222. n. 36 (1877) (Mass. ; N York ; Ohio).

Ampelophaga versicolor, Butler, *Papilio* i. p. 104 (1881) (congeneric with *rubiginosa*) ; Grote, *Hawk Moths N. Am.* p. 30 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 149. t. 7. f. 2 (genit.) (1888) (Canada to Maryland, westward to the Mississippi); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y., electr. light).

Everyx versicolor, Fernald, *Sphing. N. Engld.* p. 67. n. 32 (1886) ; Holl., *Canad. Ent.* xviii. p. 104 (1886) (on *Hydrangea arborescens*) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 43 (1889) (liter. rel. to metam.) ; Bentenm., *Bull. Amer. Mus. N. H.* vii. p. 293. t. 2. f. 10 (1895) (N.Y. ; rare ; two broods, vi. beg. vii., viii. ; on *Cephal. occid.* ; *Nesaea*).

♂♀. A beautifully coloured insect, especially on the underside. External spines of first protarsal segment slightly prolonged, but mostly concealed in the scaling. Genal process triangular, somewhat curved backwards. Thorax and abdomen with a pale mesial line as in *Ampelophaga*.

♂. Tenth tergite and sternite somewhat shorter and stouter than in *Darapsa pholus*. Friction-scales of clasper truncate not far beyond the widest point ; harpe (Pl. XLVIII. f. 14) long, slender, horizontal, curving a little upwards at end, without dentition. Penis-sheath (Pl. LIV. f. 29) with a broad ventral lobe which is dentate at the edges, and a small right process.

♀. Eighth tergite membranaceous for the greater part, the chitin-plate reduced to a narrow transverse band. Vaginal plate shaped as in *myron* ; the edge of the orifice raised to a rather strongly chitinised and triangularly sinuate ridge.

Larva green or brown ; a pale dorso-lateral line from head to fourth segment, followed by seven oblique pale side-bands extending each over two segments, the last ending at horn, which is rather long and is marked with a black stripe in front ; the pale lines with dark upper edges ; a dark dorsal line.—Food-plants : *Cephalanthus ; Hydrangea : Nesaea.*

Pupa abruptly rounded behind ; cremaster thin, almost cylindrical.

Hab. Canada to Maryland (probably farther south) ; westward to the Mississippi basin.

Rather rare everywhere.

In the Tring Museum 3 larvae, 2 pupae, 8 ♂♂, 9 ♀♀ from : Canada ; Long Island.

442. Ampeloeca myron.

Sphinx myron Cramer, *Pap. Exot.* iii. p. 91. t. 247. f. c (1779) (Virginia).

Sphinx pampinatrix Abbot & Smith, *Ins. Georgia* i. p. 55. t. 28 (1797).

Otus myron, Hübner, *Verz. bek. Schm.* p. 142. n. 1524 (1822) ; Grote, *Proc. Ent. Soc. Philad.* v. p. 81 (1865) ; id. & Rob., *ibid.* p. 153. n. 31 (1865) ; Beth., *Canad. Ent.* i. p. 10 (1869) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 546. n. 3 (1877) ; id., *Papilio* i. p. 104 (1881).

Otus cnotus Hübner, *Zuträge* p. 23. f. 321. 322 (1823).

Smerinthus myron, Serville & Lep., *Enc. Meth.* x. p. 441 (1825).

Choerocampa pampinatrix Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 301. n. 1 (1839) ; Harris, ed. Flint, *Ins. Inj. Veg.* p. 327. fig. 152. 153. 154. t. 5. f. 4 (1862) (life hist.) ; Morris, *ibid.* note (1862) (=*myron* = *cnotus*) ; Saund., *Canad. Ent.* iii. p. 66. f. 25. 26. 27 (*l.*, *p.*, *i.*), f. 28. 29 (paras.) (1871) ; Pack., *Common Ins.* p. 57. f. 47. 48 (1873).

Darapsa myron, Walker, *List Lep. Ins. B. M.* viii. p. 183. n. 2 (1856) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 147. n. 27 (1859) ; Morris, *Cat. Lep. N. Am.* p. 19 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 168. n. 2 (1862) ; Grote, *Proc. Ent. Soc. Philad.* iii. p. 93 (1864) (Mass.) ; Lintn., *Proc. Ent. Soc. Philad.* iii. p. 663 (1864) (life hist.) ; Grote, *Canad. Ent.* iii. p. 101 (1871) (Alabama) ; Lint., *Ent. Contr.* i. p. 192 (1872) (N. Y., vi. viii.) ; Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., vi. beg. vii.) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 22 (1874) ; id., *l.c.* ii. p. 225. n. 37 (1875) ; Caulf., *Canad. Ent.* vii. p. 241 (1875) (Montreal, vi. vii.) ; Dimm. & Mann, *Psyche* ii. p. 69 (1877) ; Hulst, *Bull. Brookl. Ent. Soc.* ii p. 35 (1879) ; Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O.) ; Edw. & Ell., *Papilio* iii. p. 126 (1883) (larva, diff. from *rhoerilus*) ; Saund., *Ins. Inj. Fruits* p. 244. fig. 253—257 (1883).

Everyx myron var. ? an sp., *Schaufuss, Numq. Otios.* p. 20 (1870).
Everyx myron, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 209. n. 1 (1875) ; Grote, *l.c.* iii. p. 222. n. 38 (1877) ; id., *Canad. Ent.* ix. p. 131 (1877) ; Fern., *Sphing. N. Engld.* p. 65. n. 31. t. 5. f. 1. 2. 3. (*l.*, *p.*, *i.*) (1886) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 42 (1889) (liter. rel. to metam) ; Kirby, *Cat. Lep. Het.* i. p. 673. n. 3 (1892) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 292. t. 2. f. 9. (1895) (N.Y. ; common, two broods ; on *Ampelopsis* and *Vitis*) ; Rowl., *Ent. News* ix. p. 191 (1898) (Miss. ; common on Vine, wing rust-red in summer brood).
Ampelophaga myron, Grote, *Canad. Ent.* xviii. p. 132 (1886) ; id., *Hawk Moths N. Am.* p. 30 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 148. t. 6. f. 9 (genit.) (1888) (Canada to Georgia, westward to Missouri, Iowa) ; Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y., electr. light) ; Cross, *Ent. News* vii. p. 297 (1896) (N. Hampshire) ; Trum., *Ent. News* viii. p. 27 (1897) (S. Dakota).

♂ ♀. External row of spines of first protarsal segment irregularly doubled in basal half. Spurs shorter than in *versicolor*, crest of head higher, apex of forewing and angle SM^2 of hindwing more projecting. The individuals in which the pale olive-green colour has nearly or totally disappeared from the upperside of the forewing are rarer in the north than the south. It is possible that a greater percentage of the individuals of the second brood than of the first belong to the uniformly coloured f. *enotus* ; observations on this point are a desideratum.

♂. Tenth segment as in *Darapsa pholus*. Friction-scales of clasper numerous, truncate ; harpe (Pl. XLVIII. f. 12) with a short stout process which is thinnest at the base ; the upperside of this process covered with minute teeth, the underside also rough with teeth, the sides finely rugose. Penis-sheath (Pl. LIV. f. 19) : right process smaller than left, simple or dentate, the left dentate at the edges.

♀. Eighth tergite as in *Darapsa pholus*, the sides somewhat produced. Vaginal plate narrower apically than in *D. pholus*, the raised edge of the vaginal orifice less chitinised.

Larva green or brown, in various shades, a pale dorso-lateral line from fourth segment to horn, to which line are joined oblique pale side-bands which terminate at the line and are each restricted to one segment ; horn with black granules ; a dorsal series of pale patches with dark (brown or reddish) centres.—Food-plants : *Ampelopsis* : *Vitis*.

Pupa slenderer than in *versicolor*, with vestige of anteocular tubercle ; cremaster long, conical, tip bifid.

Hab. Canada to Florida, westward to the Mississippi basin.

In the Tring Museum 9 larvae, 7 pupae, 54 ♂♂, 26 ♀♀ from : Florida, v. viii. ; N. Carolina, vii. ; W. Virginia, vii. viii. ; Illinois, vi. ; Iowa ; Long Island ; Massachusetts, vi.

CXXII. DARAPSA.—Type : *pholus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* i. p. 137 (1776).
Otus, Hübner (*non* Cuvier, 1800), *Verz. bek. Schm.* p. 142 (1822) (type : *choerilus*=*pholus*).
Smerinthus, Serville & Lepelletier (*non* Latreille, 1802), *Enc. Méth.* x. p. 441 (1825).
Choerocampa, Harris (*non* Duponchel, 1835), in Sillim., *Journ. Sc. Art* xxxvi. p. 302 (1839).
Darapsa Walker, *List Lep. Ins. B. M.* viii. p. 182 (1856) (partim ; type : *choerilus*=*pholus*).
Everyx Boisduval, *Spec. Gén. Lep. Hét.* i. p. 208 (1875) (partim ; incl. type of *Darapsa*).
Ampelophaga, Smith (*non* Butler, 1881), *Trans. Amer. Ent. Soc.* xv. p. 146 (1888).

♂ ♀. Differs from *Ampeloeca* in all the tibiae being spinose. SC^2 and R^1 of hindwing on a short stalk.

Hab. Atlantic district of Nearctic Region.

One species.

We keep *pholus* (= *choerilus*) generically separate from *myron* and *versicolor*, (1) because the species is, in the spinose tibiae, one step farther advanced than its American and Oriental allies, and (2) because the separation of *pholus* on account of such a conspicuous character as the spinosity of the tibiae will facilitate the construction of a workable key to the genera.

443. Darapsa pholus.

Sphinx pholus Cramer, *Pap. Exot.* i. p. 137. t. 87. f. B (1776) ("Ind. occ." err. loc.); Goeze, *Ent. Beytr.* iii. 2. p. 221. n. 60 (1780); Fabr., *Spec. Ins.* ii. p. 143. n. 20 (1781); id., *Mant. Ins.* ii. p. 94. n. 23 (1787); Gmel., *Syst. Nat.* i. 5. p. 2376. n. 65 (1790); Fabr., *Ent. Syst.* iii. 1. p. 363. n. 24 (1793).

Sphinx choerilus Cramer, *Pap. Exot.* iii. p. 91. t. 247. f. A (1779) (Virginia).

Sphinx azalvae Abbot & Smith, *Lep. Georgia* i. p. 53. t. 27 (1797).

Sphinx chlorinda Martyn, *Psyche* t. 25. f. 66. 67 (1797).

Otus choerilus, Hübner, *Verz. bek. Schm.* p. 142. n. 1523 (1822); Grote, *Proc. Ent. Soc. Philad.* v. p. 81 (1865); id. & Rob., *ibid.* v. p. 153. n. 30 (1865); Beth., *Canad. Ent.* i. p. 10 (1869); Bowl., *Canad. Ent.* iii. p. 145 (1871) (Quebec, vi.); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 22 (1874); id., *l.c.* ii. p. 225. n. 35 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 545. n. 2 (1877) (= *clorinda*); id., *Papilio* i. p. 104 (1881).

Smerinthus choerilus, Serville & Lep., *Enc. Méth.* x. p. 441 (1825).

Choerocampa choerilus, Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 302. n. 2 (1839) (= *azaleae*).

Darapsa chaerilus (!), Walker, *List Lep. Ins. B. M.* viii. p. 182. n. 1 (1856); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 147. n. 26 (1859).

Darapsa choerilus, Morris, *Cat. Lep. N. Am.* p. 19 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 168. n. 1 (1862); Lint., *Ent. Contr.* i. p. 192 (1872) (N.Y., vi.); id., *l.c.* iii. p. 179 (1872) (N.Y.); Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., vi. vii.); Peck, *Canad. Ent.* viii. p. 239 (1876) (Maine; larva notic.); Dimm. & Mann, *Psyche* ii. p. 68 (1877); Hulst, *Bull. Brookl. Ent. Soc.* ii. p. 35 (1879); Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 192. t. 4. f. 34 (1882) (larva); Edw. & Ell., *Papilio* iii. p. 126 (1883) (larva, diff. from *myron*).

Darapsa pholus, Walker, *List Lep. Ins. B. M.* viii. p. 184. n. 3 (1856); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 148. n. 28 (1859); Morris, *Cat. Lep. N. Am.* p. 19 (1860); Clem., in Morris, *Syn. Lep. N Am.* p. 169. n. 3 (1862).

Otus pholus, Grote, *Proc. Ent. Soc. Philad.* v. p. 81 (1865); id. & Rob., *ibid.* v. p. 154. n. 33 (1865).

Ceryx choerilus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 210. n. 2 (1875); Grote, *l.c.* p. 120 (1877) (L. Erie); id., *Canad. Ent.* ix. p. 131 (1877); Hill, *Papilio* iii. p. 27 (1883) (Adirondacks, 2200 ft., vii.); Fern., *ibid.* xvi. p. 21 (1884) (Maine, rare, vii.); Grote, *l.c.* xviii. p. 132. n. 30 (1886); Fern., *Sphing. N. Engld.* p. 64. n. 30 (1886); Grote, *Hawk Moths N. Am.* p. 30 (1886); Edw., *ibid.* iii. p. 126 (1886); id., *Bull. U. St. N. Mus.* xxxv. p. 42 (1889) (liter. rel. to metam.); Kirby, *Cat. Lep. Het.* i. p. 673. n. 1 (1892); Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 291. t. 2. f. 8 (1895) (N. Y., common, double-brooded; on *Viburnum*, *Nysa*, *Azalea*); Rowl., *Ent. News* ix. p. 191 (1898) (Miss.; two broods; *l.* on *Viburnum*).

Ampelophaga choerilus, Smith, *Trans. Amer. Ent. Soc.* xv. p. 147. t. 6. f. 8 (genit.) (1888) (Canada to Georgia, westward to Missouri, Iowa); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y., electr. light); Cross, *Ent. News* vii. p. 297 (1896) (N. Hampshire); Hanh., *Canad. Ent.* xxxi. p. 50 (1899) (Manitoba); Heath, *ibid.* xxxii. p. 94 (1900) (Manitoba, E. of vi.).

Ceryx pholus, Kirby, *l.c.* p. 673. n. 2 (1892).

The figure of *pholus* given by Cramer is very rough; it does not agree with any specimen of the present species which we have seen. But one must not be too exacting; many of Cramer's figures bear only a superficial resemblance to the insects they are meant to represent, especially in the first volume. We think it was not so much the roughness of the figure which prevented it being referred to the common North American species known as *choerilus*, but the locality, which is given as the West Indies. The individual figured came from the collection of E. de Marre. In the same collection was the type of Cramer's *japix* figured on the same plate, and said to be from New York, where it does not occur. On Pl. XXIV. Cramer figures two butterflies from the said collection, and remarks

on p. 38 in respect to *Callicore clymena* : ". . . on rencontre des taches qui ont du rapport avec les chiffres 88. Si de là on se plairait à prendre un nom pour ce Papillon, on le nommerait le Porte nombre des **Indes occidentales**. . . . Il est d'Esseqnebo." [Black type ours.] On the same page he gives the West Indies as habitat of the South American *Eunica curota*, which he figures also from the collection E. de Marre.

From this it is quite clear (1) that the localities in E. de Marre's collection were not reliable (the same applies to other collections from which Cramer received specimens for his work); (2) that the localities of *japix* (N. York) and *pholus* (W. Indies) got changed, the Neotropic *japix* having come from "the West Indies," and the Nearctic *pholus* from New York ; (3) that the term "West Indies" was used so loosely as to include Surinam, where *japix* occurs. (See also *Protoparce brontes*.)

♂♀. The external discal line of the forewing becomes sometimes more distinct and loses the teeth.

♂. Tenth tergite rounded-truncate ; sternite rather slender, obtusely pointed. Friction-scales of clasper truncate, not large ; harpe (Pl. XLVIII. f. 13) ending in a nearly straight, oblique process, which is somewhat flattened on upperside at end and here armed with numerous minute teeth. Right and left processes of penis-sheath dentate (Pl. LIV. f. 18), the left one much the smaller; dentition individually variable ; apical edge of sheath not always oblique as in figure, but often equally curved right and left.

♀. Eighth tergite truncate, not sinuate (Pl. XLI. f. 12). Vaginal plate (Pl. XLI. f. 11) evenly rounded at the sides and apex ; lateral and anterior edges of orifice raised into a smooth ridge.

Larva like that of *Ampeloeca myron*, but thorax with white dorso-lateral line, and the pale dorsal mesial patches with dark centres found in *A. myron* absent.—Food-plants : same as those of *A. myron*.

Pupa as in *A. myron*.

Hab. Atlantic district of Nearctic Region: Canada to Georgia (probably farther south), westward to the Mississippi basin.

In the Tring Museum 3 larvae, 1 pupa, 27 ♂♂, 14 ♀♀ from : Iowa, Massachusetts, Long Island, Pennsylvania.

CXXIII. ACOSMERYX.—Typus : *anceus*.

Sphinx, Stoll, in Cramer, *Pap. Exot.* iv. p. 124 (1781).
Enyo Hübner, *Verz. bek. Schm.* p. 132 (1822) (partim ; type : *japix*).
Philampelus, Walker (*non* Harris, 1839), *List Lep. Ins. B. M.* viii. p. 173 (1856).
Zonilia id. (*non* id . 1856) *l.c.* xxxi. p. 34 (1864).
Daphnusa Murray (*non* Walker, 1856), *Cist. Ent.* i. p. 178 (1873).
Acosmeryx Boisduval, *Spec. Gén. Lép. Hét.* i, p. 214 (1875) (type : *anceus*).

♂♀. Genal process anguliform, curving backwards, nearly reaching tip of pilifer. Palpus large, rounded in side-view. Antenna setiform, slender, gradually thinning apicad, hook long, gradually curved ; end-segment very long, filiform, rough-scaled, penultimate one longer than vertically broad. No eyelashes. Spines of abdomen numerous, the short ones pale, rather weak, the long ones stronger. Midcoxal merum rounded behind ; long spurs twice the length of the short ones ; midtarsus with comb, spines of same not long ; hindtibia heavily scaled.—— Forewing *sinuate* between SC^1 and SC^5.

♂. Praecoxal scent-organ vestigial. Sexual armature not very different in the various species, that of *anceus* being the best characterised (in both sexes). Tenth tergite simple, long, slender, slightly curved; sternite shorter, broader, somewhat boat-shaped, with the apex always sinuate (Pl. XLIV. f. 23. 24). Clasper large, sole-shaped, with three or four rows of large friction-scales; harpe (Pl. XLVIII. f. 22—27) dilated at end, the dilated part armed with spine-like teeth which are directed upwards. Penis-sheath with a dentate lobe at left side, continuous with a slender, acute process at right side (Pl. LV. f. 19—26).

♀. Vaginal plate (Pl. XLI. f. 8—10) suddenly narrowed distally; orifice transverse, postmedian, sometimes covered by a bilobate ridge. Eighth tergite deeply sinuate, separate from sternite.

Larva tapering in front; head small, horn acute, curved anad; a white, lateral, subdorsal stripe from head to horn, yellow and indistinct on four or five anterior segments; below stigmata a yellowish oblique band on segments 5 to 9 or 10; thorax with ventro-lateral line which ends in a patch on fourth segment.—Food-plants: *Cissus*; *Nerium*.

Pupa with two frontal tubercles, tongue-case somewhat enlarged ventrally.

Hab. Oriental Region: from Japan to Ceylon, eastward to New Guinea and Australia.

Seven species, some of which are easily confounded, if not carefully examined, the genus being very uniform in structure and pattern.

Key to the species:

a.	Grey submarginal line or band of forewing, above, straight, extending to SM^2	445. *A. naga.*
	Grey submarginal line or band of forewing, above, curved, ending at R^3 or a little beyond	*b.*
b.	Fore- and hindwing distinctly dentate	*c.*
	Fore- and hindwing not dentate	*d.*
c.	First discal line of forewing straight from R^3 to SM^2, heavy	446. *A. sericeus.*
	First discal line of forewing thin, interrupted	447. *A. omissa.*
d.	Hindwing below nearly all ferruginous tawny or vinaceous, ground-colour of upperside of forewing tawny cinnamon to chestnut-brown	*e.*
	Hindwing below much shaded with olive-grey, ground-colour of upperside of forewing greyish olive	*f.*
e.	Underside ochraceous clay-colour, brown distal border of hindwing indistinct; or underside more or less vinaceous, with pinkish grey submarginal scaling on the forewing	444. *A. anceus.*
	Underside of wings ferruginous tawny on disc, distal marginal brown border broad and heavy, pale submarginal scaling of forewing almost white	448. *A. castanea.*
f.	Lobe SC^5 of forewing as prominent as lobe SC^4	449. *A. miskini.*
	Lobe SC^5 of forewing less prominent than lobe SC^4	450. *A. socrates.*

444. Acosmeryx anceus.

Sphinx anceus Stoll, in Cramer, *Pap. Exot.* iv. p. 124. t. 355. f. A (1781) (Amboina).

Sphinx anvetus (!) id., *l.c. Index* (1781).

Enyo anceus, Hübner, *Verz. bek. Schm.* p. 132. n. 1423 (1822); Walker, *List Lep. Ins. B. M.* viii. p. 119. n. 13 (1856).

Acosmeryx anceus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 215. n. 1 (1875) (Amboina); Butl., *Trans Zool. Soc. Lond.* ix. p. 544. n. 3 t. 90. f. 11. 12 (*l., p.*) (1877) (Amboina; Java); Kirby, *Cat. Lep. Het.* i. p. 648. n. 1 (1892).

Acosmeryx ancea (!), Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 81. n. 115 (1892) (partim).

♂♀. The smallest species of the genus, variable in tint. Palpus, breast and first two abdominal sternites paler than in the other species, more pinkish. Wings not dentate, or the teeth very faintly indicated, but forewing distinctly angulate at R^3.——Forewing: the oblique distal band diffused posteriorly; the first discal line rather heavy, continuous; the greyish costal subapical area either stopping at R^1, or extending beyond this vein; the curved pinkish grey submarginal line broad, generally continuous with the apical lunules of the same colour.

Underside: both wings different from those of all the other species.——Forewing: a subapical, costal, triangular, chestnut patch extending to R^1, straight proximally, where it is bordered by a grey or pinkish grey line or patch; the outer disc between R^1 and SM^2 ferruginous tawny or pinkish vinaceous, or vinaceous cinnamon, not so dark as the subapical patch; pinkish grey submarginal scaling extended, diffuse, basal half of costal margin mostly of the same colour as the hindwing.——Hindwing: brown marginal border vestigial, narrow, sometimes better marked, reaching at R^2 only half-way to the second pair of discal lines.

♂. Harpe (Pl. XLVIII. f. 25) remarkably different from those of the other species, being much prolonged. Penis-sheath (Pl. LV. f. 24) with a broad left process which is rounded at end and is dentate at the distal and proximal edges; f. 23 represents the sheath in a dextro-lateral view.

♀. Vaginal plate (Pl. XLI. f. 10) widely different from that of most other species, the difference corresponding to that found in the harpe of the ♂; sides of the plate nearly parallel, suddenly converging near end, apical part narrow, deeply concave; orifice of vagina covered by a half-cylinder, the apical edge of which is sinuate, the prominent lobes obliquely rounded; proximal part of the plate submembranaceous, almost regularly folded, while the lateral parts are smooth and deeply concave at the sides of the half-cylinder.

Larva, as figured by Butler, differs from that of *socrates* in the narrower lateral line; the figure given in Horsfield & Moore, *l.c.*, has a broad line, and may be that of *socrates* f. *cinerea*.

Hab. North India to New Guinea and Queensland.

Two subspecies:

a. A. anceus subdentata subsp. nov.

Philampelus anceus, Moore, in Horsf. & Moore, *Cat. Lep. Mus. E. I. C.* i. p. 270. n. 624. t. 9. f. 4. 4a (*l., p.*) (1857) (Java; Penang; on *Cissus*); id., *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal).

Acosmeryx anceus, Butler, *l.c.* (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 8. n. 46 (1887) (Silhet: Sikhim); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 9. n. 35 (1892) (India); Huwe, *Berl. Ent. Zeitschr.* xl. p. 364. n. 14 (1895) (Java).

Acosmeryx mixtura, Pagenstecher (*non* Walker, 1864), *Jahrb. Nass. Ver. Nat.* xlix. p. 155. n. 115 (1896) (Sumba).

Acosmeryx ancea f. *ancea*, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 409. n. 115 (1898) (Sikhim Bhutan, 2000 ft., viii.).

Acosmeryx acteus (!), Pagenstecher, *l.c.* li. p. 194 (1898) (Sambawa).

♂ ♀. Forewing more elongate than in the eastern form, more distinctly angulate at R^3, often with traces of teeth, rather deeper in tint and more sharply marked, the obliqne discal band more produced distad behind R^2; black submarginal line of underside better marked, more projecting basad at R^2, disc as well as underside of abdomen brighter red.

Hab. North India to Sambawa.

In the Tring Museum 14 ♂♂, 5 ♀♀ from: Sikhim; Bhutan; Cherrapunji; Khasia Hills; Sumatra; Java.

b. A. anceus anceus.

Sphinx anceus Stoll, *l.c.*

Eugo anceus, Hübner, *l.c.*

**Zonilia mixtura* Walker, *l.c.* xxxi. p. 34 (1861) (Aru;—Mus. Oxford).

**Acosmeryx daulis* Boisduval, *l.c.* p. 218. n. 5 (1875) (hab. ?).

Eugo cinnamomea Herrich-Schäffer, *Ausser. Schmett.* ii. f. 558 (1869) (N. Austral.).

Acosmeryx anceus, Boisduval, *l.c.* p. 215. n. 1 (1875) (Amboina): Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 105. n. 198 (1888) (Amboina).

Eugo ? cinnamomea, Butler, *l.c.* p. 542. n. 5 (1877).

Acosmeryx mixtura, id., *l.c.* p. 545. n. 5 (1877); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 9. n. 36. t. 1. f. 7 (1892) (Aru, *type*); Pagenst., *Abh. Senk. Nat. Ges.* xxiii. p. 443. n. 422 (1897) (Uliasser Is.).

Acosmeryx miskini, Kirby, *Trans. Ent. Soc. Lond.* p. 234 (1877) (Austral.); Misk., *Proc. Roy. Soc. Queensld.* viii. p. 8. n. 8 (1891) (partim; Newcastle; Rockhampton; Brisbane).

Acosmeryx cinerea, Pagenstecher, *Iris* i. p. 86. n. 2 (1886) (Aru); id., *Jahrb. Nass. Ver. Nat.* xxxix. p. 109. n. 2 (1886) (Aru).

Acosmeryx meskini (!), Maassen, *Stett. Ent. Zeit.* xli. p. 54 (1880) (= *cinnamomea*).

Acosmeryx sericeus, Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 8. n. 9 (1891) (partim; Brisbane; Cardwell).

Acosmeryx cinnamomea, id., *l.c.* n. 10 (1891); Kirby, *l.c.* p. 648. n. 2 (1892).

♂ ♀. Variable; stigma of forewing generally conspicuous. Two forms. One dark, similar to *anceus subdentata*; the other much paler, forewing less variegated. The two forms occur together and graduate into one another.

Hab. Moluccas eastwards to German New Guinea, the d'Entrecasteaux Islands, Woodlark I.; Queensland and N. S. Wales.

In the Tring Museum 30 ♂♂, 21 ♀♀ from: Amboina; Little Key (Kühn); Larat, Tenimber (Kühn); Queensland, from Brisbane to Cape York; British and German N. Guinea; Trobriand Is. (Meek); Fergusson, d'Entrecasteaux Is. (Meek); Woodlark (Meek).

445. Acosmeryx naga.

**Philampelus naga* Moore, in Horsf. & Moore, *Cat. Lep. Ins. E. I. C.* i. p. 271. n. 626 (1857) (Darjiling;—Mus. Brit.); id., *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal).

Acosmeryx naga Boisduval, *Spec. Gén. Lép. Hét.* i. p. 217. n. 13 (1875) (Darjiling); Cot. & Swinh., *Cat. Moths Ind.* i. p. 9. n. 48 (1887) (Sikhim; Simla); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 9. n. 37 (1892) (India); Kirby, *Cat. Lep. Het.* i. p. 649. n. 8. (1892) (Darjiling); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 83. n. 116 (1892) (N.W. & E. Himalayas); Leech, *Trans. Ent. Soc. Lond.* p. 282. n. 49 (1898) (Hakodate, vi.); Dudg., *Journ. Bombay N. H. Soc.* ix. p. 409. n. 116 (1898) (Sikhim, 3000 ft., common).

**Acosmeryx sherrilli* Boisduval, *l.c.* n. 13 (1875) (coll. Charles Oberthür).

**Acosmeryx metanaga* Butler, *Ann. Mag. N. H.* (5). iv. p. 350 (1879) (Japan;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 649. n. 10 (1892).

Acosmeryx anceus, Leech, *Proc. Zool. Soc. Lond.* p. 585. n. 19 (1888) (partim).

♂ ♀. The most conspicuously marked species of the genus, easily distinguished from all the others by the pattern of the forewing; brown discal band extending from costa towards middle of distal margin, sharply defined in front, the triangular

area limited by it grey ; a rather sharply defined grey submarginal band from SC^5 to tip of SM^2, nearly straight, not undulate.

♂. Antenna long. Tenth sternite with parallel sides. Process of harpe rather acute distally (Pl. XLVIII. f. 23), resembling a hand with the thumb lying against the forefinger and the other fingers curved back- and upwards. Penis-sheath (Pl. LV. f. 19) : left lobe shorter than in all the other species.

♀. Vaginal plate resembling that of *anceus*.

Larva not known.

Hab. North India ; Japan.

In the Tring Museum 16 ♂♂, 1 ♀ from : Kumaon ; Kulu ; Sikhim ; Bhutan.

446. **Acosmeryx sericeus.**

**Philampelus sericeus* Walker, *List Lep. Ins. B. M.* viii. p. 181. n. 13 (1856) (Silhet ; partim ;—Mus. Brit.) ; Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E.I.C.* i. p. 271. n. 625 (1857) (Silhet ; Darjiling) ; id., *Proc. Zool. Soc. Lond.* p. 675 (1867) (Silhet).

**Acosmeryx anceoides* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 216. n. 2 (1875) (Borneo ; Philipp, N. India ; partim ? ;—coll. Charles Oberthür).

Acosmeryx sericeus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 544. n. 2 (1877) (Silhet) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 1. t. 76. f. 2 (1881) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 8. n. 45 (1887) (Silhet ; Sikhim) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 8. n. 34 (1892) (Assam) ; Semp., *Schmett. Philipp.* ii. p. 393. n. 26 (1896) (Luzon, vii.).

Acosmeryx sericea, Kirby, *Cat. Lep. Het.* i. p. 649. n. 7 (1892) (N. India).

Acosmeryx anceu, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 81. n. 115 (1892) (partim).

Acosmeryx anceu f. *sericea*, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 409. n. 115 (1898) (Sikhim, Bhutan, 2000 ft., vi. viii.).

♂♀. Metanotum chocolate-tawny at sides ; chestnut-brown markings of abdominal tergites rather prominent.——Forewing, above, much shaded with violaceous grey, the brown lines more prominent than in the other species ; first discal line heavy, straight from R^3 to inner margin, anteriorly merged together with an oblique band which reaches distal margin just before hinder angle ; grey submarginal band ending at or just beyond R^3 ; distal margin dentate.——Hindwing : an indistinct brown discal line, followed by a likewise indistinct paler band, which is slightly tawny.

Underside of abdomen, of nearly the whole hindwing, and disc of forewing along marginal band bright tawny ; white scaling at costal margins between the lines conspicuous.

♂. Antenna shorter than in *naga*, agreeing with those of all the following species. Tenth sternite (Pl. XLIV. f. 23) widest in middle. Process of harpe (Pl. XLVIII. f. 26) distally more rounded than in *naga*, the ventral ridge higher and not dentate. Left process of penis-sheath broad (Pl. LV. f. 20).

♀. Not dissected.

Early stages not known.

Hab. North India to the Philippines.

In the Tring Museum 12 ♂♂ from : Sikhim ; Bhutan ; Khasia Hills.

447. **Acosmeryx omissa** spec. nov.

Acosmeryx anceu, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 81. n. 115 (1892) (partim) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 409. n. 115 (1898) (partim).

♂♀. Easily confounded with *sericeus* ; *upperside* far more uniform in colour, much less variegated with grey and chestnut.——Forewing : antemedian curved band less extended brown than in *sericeus*, the two lines composing it being

separated for the greater part ; first discal line thin, broken at the veins like the following lines, bars M^1—M^2 of lines 3 and 4 heavier and closer together, often forming a single patch ; oblique band as in *sericeus* in position, narrower in front, more or less dilated distad at R^2. The discal and submarginal obscure bands of the hindwing of *sericeus* are also marked in *omissa*.

Costal margins less marked with greyish white on *underside* than in *sericeus*, the tawny colour more restricted and less bright ; brown distal border of hindwing with a distinct white line as in *sericeus*, the border widest between R^2 and R^3, not upon R^2. Abdomen, below, less bright tawny, and breast more olivaceous than in the previous insect.

♂. Tenth sternite (Pl. XLIV. f. 24) slightly widened apically. Process of harpe (Pl. XLVIII f. 24) less triangular than in the preceding species, the hinder edge not so heavily dentate, the teeth being confined nearly to the very edge of the process. Left process of penis-sheath (Pl. LV. f. 21) nearly horizontal, less oblique than in *sericeus* and the following species.

♀. Not dissected.

Early stages not known.

Hab. North India.

In the Tring Museum 18 ♂♂ from : Buxa, Bhutan (*type*) ; Sikhim.

448. **Acosmeryx castanea** spec. nov.

Acosmeryx anceus, Leech (*non* Cramer, 1781), *Proc. Zool. Soc. Lond.* p. 585. n. 19 (1888) (partim) ; Kirby, *Cat. Lep. Het.* i. p. 648. n. 1 (1892) (partim) ; Leech, *Trans. Ent. Soc. Lond.* p. 281. n. 47 (1898) (partim ; Yokohama ; Kiukiang, vii.).

♂♀. Chestnut-brown above, shaded with grey, the dark markings of thorax and abdomen quite indistinct ; breast olivaceous cinnamon-rufous, underside of abdomen ferruginous.

Wings not dentate, or the teeth barely vestigial ; less elongate than in *omissa*. *Upperside*, forewing : resembling *omissa*, oblique discal band widened distad between R^2 and M^1, its proximal edge more curved than in *omissa*, first discal line also weak, barely more distinct on the dark ground, bars M^1—M^2 of discal lines 3 and 4 not heavier than the others, nor closer together ; grey subapical area sharply limited at R^2 in a similar way as in *naga*, not extending beyond this vein ; antemedian band more or less filled in with brown.——Hindwing less olive-grey than in *naga* and *omissa* ; disc somewhat cinnamon-rufous along the rather distinctly marked chestnut-olive distal marginal band ; a faint discal line from costa to anal angle.

Underside : outer disc of forewing and disc of hindwing more reddish tawny than in *sericeus*, and far more so than in *omissa* ; grey costal scaling not more conspicuous than in *omissa* ; grey scaling within distal marginal border of forewing diffuse, less distinct than in the previous species.

♂. Lobes of tenth sternite almost pointed. Process of harpe similar to that of *sericeus*, the ventral edge dentate (Pl. XLVIII. f. 27). Penis-sheath more strongly and obliquely rounded than in the other species, the armature helmet-like (Pl. LV. f. 22).

♀. Vaginal plates (Pl. XLI. f. 8) transversely folded ; orifice free, subapical.

Early stages not known.

Hab. Japan ; China.

In the Tring Museum 7 ♂♂, 4 ♀♀ from : Yokohama, vi. viii ; *type :* 25. vi. 1896.

449. Acosmeryx miskini.

**Daphnusa miskini* Murray, *Cist. Ent.* i. p. 178 (1873) (Queensland ;—Mus. Brit.).
Acosmeryx miskini, Butler, *Trans. Zool. Soc. Lond.* ix. p. 544. n. 4 (1877) (*type* in B. M.) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 8. n. 8. (1891) (partim) ; Kirby, *Cat. Lep. Het.* i. p. 649. n. 3 (1892) (partim) : Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 9. n. 38 (1892) (Moreton B.).
(?)*Acosmeryx sericeus*, Miskin, *l.c.* n. 9 (1891) (partim ?).

♂ ♀. Similar to *A. socrates f. cinerea*, but forewing more deeply sinuate at apex, lobe SC^5 being as much produced as lobe SC^4, margin below SC^5 rather deeply concave, upper surface more uniformly grey, discal band less black. Abdomen pale grey above, with blackish triangular lateral patches at the bases of tergites 3 to 5.

♂. Process of harpe (Pl. XLVIII. f. 22) much less triangular than in *socrates*, coming nearest that of *omissa*, teeth not prominent. Left process of penis-sheath (Pl. LV. f. 26) triangular ; f. 25 representing the sheath from the right side.

Early stages not known.

Hab. Queensland ; New Guinea.

In the Tring Museum 3 ♂♂ from : N. S. Wales (ex coll. Felder) ; Milne Bay, Brit. N. Guinea, xii. '98 (A. S. Meek).

A fine ♂ in the Museum at Budapest from Stephansort, German New Guinea.

450. Acosmeryx socrates.

Philampelus sericeus Walker, *l.c.* (1856) (partim).
**Acosmeryx shervilli* Boisduval (*nom* id., *l.c.* n. 3), *Spec. Gén. Lép. Hét.* p. 217. n. 4 (1875) (Darjiling ;—coll. Charles Oberthür).
**Acosmeryx socrates* id., *l.c.* p. 219. n. 6 (1875) (Manila ;—coll. Charles Oberthür).

♂ ♀. Differs from all the other species in the less deeply sinuate apex of the forewing, the lobe SC^5 being less produced than the apical lobe. Grey like *miskini*.. Wings not dentate.——Forewing, *above* : markings nearly as in *omissa* ; third discal line M^1—SM^2 faint or absent.——Hindwing blackish in apical third, this area not divided, the dark discal line of the other species being visible only near anal angle.

Underside less ferruginous tawny than in *sericeus*, *omissa*, etc. ; marginal band of forewing widest at R^2, this projection generally rounded or sinuate.

♂. Sexual armature as in *miskini*, differing in the harpe, which is shaped and armed as in *sericeus*.

♀. Vaginal plate (Pl. XLI. f. 9) as in *castanea* and *naga*, orifice rather more proximal, with a concave space in front surrounded by a fold.

Larva figured by Moore and Semper (*l.l.c.c.*, see below) : the figures do not quite agree, but that may be due to individual variations in the caterpillars, or in the artistic talent of the authors.

Pupa also figured, but details not recognisable.

Hab. North India, Ceylon, eastwards to the Philippine Islands and Java.

There are two forms, occurring together and being apparently not specifically distinct :

a'. *A. socrates f. socrates.*

**Acosmeryx socrates* Boisduval, *l.c.* (1875) (Manila) ; Kirby, *Cat. Lep. Het.* i. p. 649. n. 4 (1892) ; Semper, *Schmett. Philipp.* ii. p. 393. n. 27. t. D. f. 6. 7 (*l., p.*). t. 51. f. 6 (*l.*) (1896) (Luzon ; Cebu).

Acosmeryx pseudonaga Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 2. t. 78. f. 3 (1881) (Bhutan ;—Mus. Brit.) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 9. n. 47 (1887); Swinh., *Trans. Ent. Soc. Lond.* p. 162. n. 6 (1890) (Bassein, viii.).

Acosmeryx anceu, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 81. n. 115 (1892) (partim).

Acosmeryx anceu f. *pseudonaga*, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 409. n. 115 (1898) (Sikhim, Bhutan, 2000 ft., vi. vii. ix.).

♂♀. Oblique discal band of forewing widened behind R^2. Subapical costal patch of forewing below bright chestnut.

In the Tring Museum 7 ♂♂, 10 ♀♀ from : Ceylon ; Cherrapunji ; Khasia Hills ; Benkoelen, W. Sumatra (Ericsson); Kuching and Busan, N. Borneo ; Mt. Dulit, Sarawak.

b'. *A. socrates f. cinerea.*

Acosmeryx shervilli Boisduval (*non* id., *l.c.* sub n. 3), *l.c.* (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 631 (1877) (= ? *cinerea*) ; Kirby, *Cat. Lep. Het.* i. p. 649. n. 11 (1892) (Darjiling) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 364. n. 15 (1895) (Java).

Acosmeryx cinerea Butler, *Proc. Zool. Soc. Lond.* p. 245 (1875) (Silhet ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 544. n. 1 (1877) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 1. t. 76. f. 2 (1881) ; Moore, *Lep. Ceylon* ii. p. 24. t. 89. f. 2. 2a (*l. p., l.*) (1882) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 8. n. 44 (1887) (syn. partim ; Sibsagar ; Sikhim) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 9. n. 39 (1892) (Darjiling ; Silhet) ; Kirby, *l.c.* n. 6 (1892).

Acosmeryx anceu, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 81. n. 115. f. 51 (♂) (1892) (partim).

Acosmeryx anceu f. *cinerea*, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 409. n. 115 (1898) (Sikhim, Bhutan, 2000 ft., iii.).

♂♀. Oblique band of forewing a little more distal at costal margin than in *f. socrates*, not dilated distad behind R^2, therefore narrower and more straight than in the previous form ; disc of fore- and hindwing, below, less ferruginous tawny, subapical costal patch of forewing shaded with olive, less bright than in *f. socrates*.

In the Tring Museum 9 ♂♂, 9 ♀♀ from : Sikhim ; Silhet ; Cherrapunji ; Andamans ; Java.

As Boisduval gives the name *shervilli* as a synonym of *naga* under No. 3, he was not justified in using the same name for No. 4.

CXXIV. PANACRA.—Typus : *automedon.*

Panacra Walker, *List Lep. Ins. B. M.* viii. p. 154 (1856) (type : *automedon*).

Thyreus, Herrich-Sch. (*non* Swainson, 1821), *Ausser. Schm.* (1856).

Choerocampa, Boisduval (*non* Duponchel, 1835) *Spec. Gén. Lép. Hét.* i. p. 282 (1875).

Choerocampa, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 90 (1892).

Angonyx, Butler (*non* Boisduval, 1875), *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 6 (1881) ; Kirby *Cat. Lep. Het.* i. p. 662 (1892).

♂♀. Genal process large, triangular, concave behind, reaching nearly tip of pilifer. Palpus rather large, obtusely triangular in dorsal aspect ; second segment nearly as broad as long. Eye-lashes vestigial. Head not crested. Antenna setiform in ♂, slightly incrassate distally in ♀, hook short, abrupt, end-segment narrow, elongate-conical, not produced into a long filiform process, clothed with long bristles, the segment similar to that of *Theretra* and allies. Abdomen ending in a simple tuft ; spines weak. Merum of midcoxa not angulate ; tibiae simple ; spurs of midtibia almost the same in length ; those of hindtibia very unequal,

longer terminal one about as long as second tarsal segment; midtarsus with comb; paronychium and pulvillus present.

♂. Tenth segment simple (Pl. XLIV. f. 25—28); tergite narrow, sides parallel or slightly slanting distad, apex sinuate, truncate, or entire; sternite boat-shaped, shorter than tergite. Clasper with friction-scales, which vary in size and number; harpe (Pl. IL. f. 1—5) slender, simple, mostly somewhat spatulate. Penis-sheath with a right and a left process, the one or the other sometimes not detached, being replaced by a series of teeth.

♀. Vaginal plate elongate triangular, tip truncate, edges somewhat inerassate; orifice large, free, with the edges somewhat raised but simple.

Larva tapering in front; a small lateral ocellus on fourth segment; horn first long, in later stages short and strongly curved.—Food-plants: *Aroideae*; *Caladium*; *Philodendron*.

Pupa with tongue-case somewhat enlarged; cremaster rounded, flattened, with hooks at end, a deep cavity before it (Pl. LXIV. f. 19).

Hab. Oriental Region.

Twelve species.

The most interesting character of this genus is the *Theretra*-like end-segment of the antenna.

Key to the species :—

a. Forewing with a broad yellowish creamy line from near base to near apex; hindwing orange rufous, with brown border	451.	*P. micholitzi.*
Forewing without this conspicuous line		*b.*
b. Interspace between the antemedian and the discal lines of forewing green, like head and thorax	452.	*P. husiris.*
Median interspace not green		*c.*
c. Forewing with a conspicuous semitransparent spot SC^5—R^1 midway between base of R^1 and outer margin, besides the submarginal spots	453.	*P. splendens.*
Forewing without that spot		*d.*
d. Third and fourth discal lines of forewing heavily dentate, mesothoracic tegula with pale golden metallic scales at hinder edge	462.	*P. mydon.*
Third and fourth discal lines of forewing not dentate behind		*e.*
e. Median interspace (between the distinct antemedian lines and the first discal line) pale, band-like, a pale shade crossing the discal lines between R^2 and R^3, distal margin not angulate, not denticulate	458.	*P. variolosa.*
Median interspace not band-like, antemedian lines indistinct		*f.*
f. Distal border of hindwing below dilated before middle		*g.*
Distal border of hindwing below not dilated before middle		*i.*

g. Distal margin of forewing below clay-colour or brown, second white submarginal mark an acute angle or a triangular spot . . .	456. *P. dohertyi*, *and* 457. *P. tiridates*.
Distal margin of forewing below pale-ochraceous ; second white submarginal mark an angle of 90 or more . . .	*h*.
h. Postdiscal tawny or ochraceous area of hindwing below extended from costal to abdominal margin, interrupted before middle ; forewing not distinctly sinuate, submarginal double-line of forewing below extended to hinder margin, interspace pale, the lines not dilated in middle, but not joined to first discal line by a brownish black streak	461. *P. perfecta*.
Hindwing below as before ; forewing sinuate, submarginal lines of forewing below dilated basad, joined to first discal line along R^2, pale band of hindwing above much broader than brown marginal border . . .	460. *P. metallica*.
Postdiscal area of hindwing below almost entirely replaced by olive brown in upper half, greater part of hindwing brown ; forewing sinuate ; pale band of hindwing above very narrow	459. *P. sinuata*.
i. First discal line of forewing, above and below, in the direction of apex of wing, none of the lines reaching costal margin . . .	455. *P. automedon*.
First discal line of forewing reaching costal margin just outside fork	454. *P. malayana*.

451. Panacra micholitzi.

**Panacra micholitzi* Rothschild and Jordan, *Ann. Mag. N. H.* (6). xii. p. 456. n. 2 (1893) (Simbang); Kirby, Nov. Zool. i. p. 101. n. 16 (1894) ; Rothsch., *ibid.* ii. t. ix. f. 12 (1895).

♂. The most conspicuously coloured species. Abdomen and thorax with pale dorsal double line : underside white, abdomen with a broad brown mesial line, narrowing basad on each segment. A broad line on forewing from near base to near tip yellow cream-colour, or nearly buff-yellow ; hindwing orange-rufous, with brown border.

♂. Tenth tergite slender, not sinuate ; sternite rather long for a species of this genus, not essentially different in shape from that of *dohertyi*. Clasper with few (four) large friction-scales ; harpe comparatively broad, not narrowed to end, reaching middle of ventral edge of clasper, tip narrower and twisted ventrad. Penis-sheath subacuminate, right process replaced by a row of teeth at the edge of the sheath, left process detached, very slender, cylindrical, pointed, not dentate.

♀ and early stages not known.

Hab. New Guinea and neighbouring islands.

In the Tring Museum 3 ♂♂ from : Simbang, Huon Golfe (Micholitz); Fergusson, d'Entrecasteaux Is., xi. '94 (Meek); Milne Bay, Brit. N. Guinea, ii. '99 (Meek).

452. Panacra busiris.

**Panacra busiris* Walker, *List Lep. Ins. B. M.* viii. p. 158. n. 6 (1856) (Silhet ;—Mus. Brit.); Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 270. n. 622 (1857) (Silhet ; Canara) ; id., *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal); Boisd., *Spec. Gén. Lép. Hét.* i. p. 285. n. 1 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 549. n. 1 (1877) (Silhet); Moore, *Proc. Zool. Soc. Lond.* p. 595 (1877) (St. Blair) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 11. n. 62 (1887) ; Swinh., *Trans. Ent. Soc. Lond.* p. 163. n. 8 (1890) (Rangoon) ; id., *Cat. Lep. Het. Mus. Ox.* i. p. 13. n. 53 (1892) (Silhet).

Angonyx busiris, Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 6. t. 79. f. 2 (1881) ; Kirby, *Cat. Lep. Het.* i. p. 663. n. 1 (1892) (Silhet).

Chærocampa busiris, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 89. n. 129 (1892) (Sikhim ; Silhet) ; Swinh., *Trans. Ent. Soc. Lond.* p. 149. n. 21 (1894) (Khasia Hills ; *syn. excl.*) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 410. n. 129 (1898) (Sikhim, 1800 ft.).

♂ ♀. Distal margin of forewing deeply sinnate, apex more produced than in the other species ; angle R^2 more acute in ♂ ♂ than in most ♀ ♀ ; interspace between antemedian and discal lines green like upperside of head and thorax, contrasting with the rest of the wing.——Hindwing narrow, costal margin rather obviously dilated near base.

♂. Tenth tergite rather short and broad, not much longer than the sternite, sinnate ; sternite acuminate. Clasper with numerous rather small friction-scales ; harpe nearly as in *dohertyi* in lateral aspect, less curved. Penis-sheath : the two processes of nearly the same width, the left much longer than the right, both dentate, and situated upon a short common stem as in *Gigantocopalpus mirabilis*, *i.e.*, the mesial apical part of the sheath narrowed and produced distad before giving off the two processes.

Early stages not known.

Hab. Indo-Malayan Subregion.

In the Tring Museum 9 ♂ ♂, 9 ♀ ♀ from : Sikhim ; Khasia Hills ; Cherrapunji ; Annam ; Nicobars ; Sarawak.

453. Panacra splendens.

Panacra antomedon, Miskin (*non* Walker, 1856), *Proc. Roy. Soc. Queensld.* viii. p. 61 (1891) (partim: Mackay).

**Angonyx splendens* Rothschild, Nov. Zool., i. p. 82. t. 5. f. 15 (1894) (Queensland ;—Mus. Tring).

♂ ♀. Easily recognised by the semitransparent discal spot SC^5—R^1 of the forewing which stands midway between outer margin and base of R^1 and is generally followed by a smaller whitish spot ; and by the broad pale ochraceous-rufous band of the hindwing, which nearly reaches costal margin.——Forewing angulate at R^2, not quite so deeply sinuate as in *busiris*. The ♂ is paler than the ♀, and has mostly a broader band to the hindwing. In some cases the brown colour of the hindwing above is much reduced.

♂. Tenth tergite midway between those of *malayana* (Pl. XLIV. f. 25) and *dohertyi* (Pl. XLIV. f. 27), sinnate ; sternite curving upwards, acuminate. Clasper with numerous rather small friction-scales ; harpe about as long as in *dohertyi* (Pl. IL. f. 3), twisted and somewhat spatulate. Right and left processes of penis-sheath of nearly the same width, broader than in *dohertyi*.

Early stages not known.

Hab. Papuan Subregion : Queensland ; New Guinea ; Solomon Islands ; Moluccas.

In the Tring Museum 13 ♂ ♂, 8 ♀ ♀ from : Queensland ; Sudest I., 26. v. '98

(Meek); Rossell I., ii. '98 (Meek); Kiriwini, Trobriand Is., iv. v. '95 (Meek); Milne Bay, Brit. N. Guinea, xii. '98 (Meek); Dorey, iv. '97 (Doherty); Amboina; Shortland I., Solomon Is. (Ribbe).

454. **Panacra malayana** spec. nov. (Pl. VII. f. 24, ♂).

♂♀. Forewing deeply sinuate between apex and R^2, strongly angulate at R^2, not denticulate; first discal line crossing subcostal 1 or 2 mm. distally of fork, the following one or two lines also crossing SC^5, white anguliform mark SC^1—SC^5 contiguous with a brown spot which does not extend beyond SC^5, white anguliform spot SC^5—R^1 indistinct, little more proximal than the spot SC^4—SC^5.

Underside: distal border greyish clay-colour or drab in ♂, dark brown in ♀. ——Forewing more (♀) or less (♂) brown from base to disc (costal edge excepted); this area including the discal line, which is distinct in ♂, obscure in ♀, and is parallel to outer margin but not angulate, crossing SC^5 close to base of this vein.

♂. Tenth tergite (Pl. XLIV. f. 25) rather broad, flat, very slightly convex above, apex truncate, very faintly sinuate; sternite (Pl. XLIV. f. 26) rounded at end. Clasper with four large friction-scales; harpe ending in a long, very slender, feebly spatulate process (Pl. LL. f. 1). Penis-sheath: left process long and free, denticulate at apex and proximal edge (Pl. LV. f. 6); right process (Pl. LV. f. 5) broad, short, broadest at end, both angles produced into a tooth curving towards each other, between these teeth one or two more.

Early stages not known.

Hab. Java; Sumatra.

In the Tring Museum 2 ♂♂, 2 ♀♀ from: Java merid., 1500 ft. (rec. from H. Fruhstorfer, *type*); Java (v. d. Capellen, ex. coll. Felder).

Not difficult to distinguish from *automedon* by the position of the lines of the forewing. In Mus. München from Sumatra.

455. **Panacra automedon** (Pl. LXVI. f. 8, ♀).

**Panacra automedon* Walker, *List Lep. Ins. B. M.* viii. p. 154. n. 1 (1856) (Silhet;—Mus. Brit.); Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 269. n. 620 (1857) (Silhet); id., *Proc. Zool. Soc. Lond.* p. 675 (1867) (Silhet); Boisd., *Spec. Gén. Lép. Hét.* i. p. 286. n. 2 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 550. n. 6 (1877) (Silhet); Cot. & Swinh., *Cat. Moths Ind.* i. p. 12. n. 65 (1887); Swinh., *Trans. Ent. Soc. Lond.* p. 163. n. 9 (1890) (Rangoon); id., *Cat. Lep. Het. Mus. Ox.* i. p. 11. n. 46 (1892) (Assam; Silhet).

**Panacra truncata* Walker, *l.c.* p. 160. n. 8 (1856) (Silhet, ♂;—Mus. Brit.); Moore, *Proc. Zool. Soc. Lond.* p. 675 (1867) (Silhet); Boisd., *l.c.* p. 288. n. 5 (1875); Butl., *l.c.* p. 550. n. 5 (1877).

Augoyx automedon, Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 6. t. 79. f. 1 (1881); Kirby, *Cat. Lep. Het.* i. p. 663. n. 2 (1892).

Charrocampa automedon, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 90. n. 132 (1892) (Sikhim; Silhet; Pegu; Rangoon).

Charrocampa antomedon (!). Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 410. n. 132 (1898) (Sikhim, v.).

♂♀. Discal lines of forewing more longitudinal than in *malayana*, almost parallel to costal margin, the first line running in the direction of the apex of the wing, the lines closer together than in *malayana*, stopping behind SC^5, not curving towards costa; white angle SC^1—SC^5 preceded costally by an elongate brown shade which is longer and less distinct than the respective brown spot of *malayana*; the angle formed by the white mark and vein SC^5 is filled in with a blackish dot; white angle SC^5—R^1 more proximal than in *malayana*.

Underside: first discal line of forewing as above directed towards apex

of wing, far more longitudinal than in *malayana*, white submarginal spot SC^5—R^1 distinct.

♂. Tenth segment narrower than in *malayana*; tergite subcarinate above, being compressed, apex subsinnate; sternite as in *dohertyi*. Clasper with four large friction-scales; harpe nearly as in *malayana*, but shorter, a little broader, and more curved (Pl. IL. f. 2). Penis-sheath: left process as in *malayana*; right process (Pl. LV. f. 7) also shaped as in that species, but densely dentate at end, the teeth long, pointed, generally bearing smaller teeth.

Early stages not known.

Hab. North India to Borneo and Java.

In the Tring Museum 1 ♂, 4 ♀♀ from: Silhet; Borneo; Java (ex coll. Felder)

Our Borneo ♂ has the lines of the forewing close together; they form a conspicuous and narrow bundle.

456. **Panacra dohertyi** (Pl. LXVI. f. 4, ♀).

**Panacra dohertyi* Rothschild, Nov. Zool. i. p. 81 (1894) (Gunong Ijau, Perak;—Mus. Tring).

♂♀. Discal lines of forewing in the same position as in *automedon*, but curving costad in front and reaching costal margin, at least the distal ones; the two white subapical anguliform markings distinct, the second far more proximal than in the preceding species, its tip being 4 mm. distant from edge of wing; posterior part of mark obscure in ♂, as clearly white as upper part in ♀; distal margin of both wings denticulate.

Underside much more extended brown on forewing than in *automedon*, first discal line heavy, extended to costal margin, crossing subcostals just outside fork; clayish or brown distal border of both wings ill-defined, dilated between R^1 and R^3, reaching the external discal lines. ♂ much paler than ♀ above and below.

♂. Tenth tergite (Pl. XLIV. f. 27) longer than in *malayana* and *automedon*, only half the width, apex incised; sternite (Pl. XLIV. f. 28) more acuminate than in *malayana*. Clasper with eight to ten friction-scales arranged in three rows; harpe (Pl. IL. f. 3) shorter than in *malayana* and *automedon*, and broader, more distinctly spatulate. Penis-sheath: left process (Pl. LV. f. 4) narrow, short, dentate; right process (Pl. LV. f. 3) curved distad and laterad, more projecting than in the other species, narrow, with a few heavy teeth at the end.

Hab. Malayan Subregion.

In the Tring Museum 1 ♂, 2 ♀♀ from: Gunong Ijau, Perak (Doherty); Mt. Dulit, Sarawak (Hose); Nias (figured).

457. **Panacra tiridates.**

**Panacra tiridates* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 286. n. 3. t. 7. f. 4 (1875) (Philippines;—coll. Charles Oberthür); Butl., *Trans. Zool. Soc. Lond.* ix. p. 632 (1877); Kirby, *Cat. Lep. Het.* i. p. 663. n. 3 (1892).

Chaerocampa tiridates, Semper, *Schm. Philipp.* ii. p. 398. n. 36. t. ii. f. 3. 4 (*l., p.*) (1896) (Luzon v. vii. viii.).

♂. Like the preceding, the discal lines of the forewing less curved in front; a black costal spot outside subcostal fork, followed by a smaller costal dot; second white subapical mark a triangular spot, not regularly anguliform as in *dohertyi*.—— Tenth segment, clasper and harpe essentially as in *dohertyi*, but penis-sheath very

different : left process (Pl. LV. f. 2) replaced by two series of teeth, there being no free process ; right process (Pl. LV. f. 1) nearly as broad as in *automedon*, with long teeth at the apical margin.

Larva green, opaque, a ventro-lateral longitudinal patch on thoracical segments and greater part of eleventh segment brown ; a small ocellus on fourth segment (Semper's figure and description do not well agree with one another).

Hab. Philippine Islands.

In coll. Charles Oberthür from Manila.

In coll. Georg Semper from Luzon.

458. **Panacra variolosa.**

**Panacra variolosa* Walker, *List Lep. Ins. B. M.* viii. p. 156. n. 4 (1856) (Silhet ;—Mus. Oxford) ; Moore, *Proc. Zool. Soc. Lond.* p. 675 (1867) (Silhet) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 550. n. 11 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 12. n. 69 (1887) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 13. n. 50. t. 1. f. 4. (1892) (*type*) ; Kirby, *Cat. Lep. Het.* i. p. 662. n. 6 (1892) (=*vagans*).

Chorocampa ? variolosa, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 284. n. 83 (1875).

**Panacra vagans* Butler, *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 4. t. 78. f. 7 (1881) (Borneo : Bhutan ;—Mus. Brit.) ; Cot. & Swinh , *l.c.* p. 13. n. 74 (1887).

Chaerocampa variolosa, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 89. n. 130 (1892) (Sikhim ; Bhutan ; Borneo) ; id., *l.c.* iv. p. 453 (1896) (=*hamiltoni*) ; Dudg., *Journ. Bombay N. H Soc.* xi. p. 410. n. 130 (1898) ("not seen").

**Panacra hamiltoni* Rothschild, Nov. Zool. i. p. 82 (1894) (Khasia Hills ;—Mus. Tring).

Chaerocampa husiris, Swinhoe, *Trans. Ent. Soc. Lond.* p. 149. n. 21 (1894 (*husiris=hamiltoni* ex err.).

♂ ♀. Forewing less sinuate than in *dohertyi* ; above : subbasal and antemedian lines more distinct than in the other species ; median interspace pale, this pale shade extended towards outer margin behind R^2 ; discal lines reaching costal margin, here nearer apex of wing than in the allied species, the most distal of them touching the black border of the white submarginal spot SC^5—R^1, a pale costal spot at the outer side of this line ; hinder angle of wing very obtuse, the outer margin being more oblique than in the allies. Pale band of hindwing short and narrow.

Underside : exterior discal lines distinct on both wings, touching the submarginal line.

♂. Tenth segment as in *dohertyi*, sternite rather more pointed. Clasper with more than eight friction-scales ; harpe nearly as in *automedon*, rather more spatulate. Right process of penis-sheath intermediate between the respective processes of *dohertyi* and *automedon*, left process broader than in *dohertyi*, obliquely rounded proximally, the penis-sheath agreeing almost with that of *sinuata* and allies.

Hab. Silhet to Borneo and Java.

In the Tring Museum 4 ♂♂, 2 ♀♀ from : Khasia Hills ; Bulsit Besar, Malay States, Siam (Robinson) ; Sarawak ; E. Java.

Our only Java specimen (♂) is small and pale.

459. **Panacra sinuata** spec nov. (Pl. VI. f. 13, ♂).

♂. Middle of thorax and proximal abdominal tergites of the same pale colour as in *variolosa*, a blackish brown stripe underneath the tegula continued to abdomen. ——Forewing sinuate below apex, slightly scalloped like hindwing ; fringe prominently dotted with blackish brown ; a bundle of five discal lines, first and second fused to a band, ending at a spot at costal margin, the other three thin but sharply marked, extended to costal margin but faint in front, and nearly quite straight up to SC^5, then curved costad like the others. Pale band of hindwing not

broader than the brown (double) border of the wing, often a mere line which does not reach costal beyond R^3.

Underside: basal two-thirds of forewing and greater part of hindwing drab brown. First discal line of forewing broad, ending at a costal patch situated partly within subcostal fork : a large brown submarginal patch, extended proximad along R^2 to first discal line : a conspicuous blackish brown spot near hinder angle behind M^2. Brown border of hindwing dilated before middle and merged together with the brown basi-discal area, costal edge, abdominal margin and a narrow submarginal band, which stops at R^3, clayish ochraceous speckled with tawny and brown : three more or less dentate discal lines, second and third distinct, first the heaviest.

♂. Tenth segment similar to that of *automedon*. Clasper strongly convex dorsally beyond middle ; friction-scales large, asymmetrical, obliquely rounded-truncate, four or five in number ; harpe (Pl. IL. f. 4) ending in a stout process which is spatulate in dorsal aspect. Penis-sheath : right process nearly as in *automedon*, rather narrower and less truncate ; left process also broad, much more proximal, apex obliquely rounded, heavily dentate.

♀ and early stages not known.

Hab. North India.

In the Tring Museum 7 ♂♂ from : Sikhim (*type*) ; Khasia Hills, Assam. Confounded in collections with *metallica*.

460. Panacra metallica.

Panacra mydon Walker, *List Lep. Ins. B. M.* viii. p. 155. n. 2 (1856) (partim).

**Panacra metallica* Butler, *Proc. Zool. Soc. Lond.* p. 6. n. 9 (1875) (North India ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 550. n. 9 (1897) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 12. n. 68 (1887) ; Kirby, *Cat. Lep. Het.* i. p. 662. n. 2 (1892).

Chaerocampa metallica, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 89. n. 131 (1892) (partim) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 410. n. 131 (1898) (partim ; Sikhim, 4000 ft., v.).

♂♀. Like *sinuata*, but differs as follows : more ochraceous in tint ; side-stripe of thorax and proximal segments of abdomen tawny : discal lines of forewing less longitudinal, not reaching costal margin, slightly curved distad between SC^5 and R^2 ; clayish buff band of hindwing broader.

Underside less extended brown, basal area of forewing paler, with obvious traces of brown markings ; hindwing buff for the greater part, tinged with tawny ; submarginal buff area broader than brown marginal band, continued to costal margin, more tawny in front, interrupted before R^2.

♂. Harpe (Pl. IL. f. 5) much shorter than in *sinuata*, resembling that of *dohertyi*, but more strongly spatulate.

Early stages not known.

Hab. North India.

In the Tring Museum 5 ♂♂, 1 ♀ from : Sikhim, 20. iv. 1889 (O. Möller), and July to September 1901 (from H. Fruhstorfer) ; Buxa, Bhutan.

461. Panacra perfecta.

**Panacra perfecta* Butler, *Proc. Zool. Soc. Lond.* p. 391 (1875) (Darjiling, vi. ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 637 (1877) ; id., *Illustr. Typ. Specim. Lep. Het. B.M.* v. p. 4. t. 78. f. 6 (1881) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 13. n. 73 (1887) (Sikhim) ; Kirby, *Cat. Lep. Het.* i. p. 662. n. 1 (1892) (Darjiling).

Chaerocampa metallica, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 89. n. 131 (1892) (partim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 410. n. 131 (1898) (Sikhim ; partim ; 4000 ft., v.).

♂. Similar to *metallica* in colour.——Forewing: sinus below apex vestigial or quite absent, discal lines a little more longitudinal than in *sinuata*, the first being at hinder margin nearer the base than in *sinuata*, the three outer ones not reaching SC^5, first and second also obsolescent near costal margin; a distinct double submarginal line, parallel to outer margin. Pale band of hindwing a little wider than in *sinuata*, nearly reaching costal margin, but much obscured by brown scaling in upper half.

Underside as in *metallica*, but discal line of forewing more oblique, abbreviated, a pair of more distinct submarginal lines with whitish interspace, brown submarginal patch R^1—R^2 smaller, far less produced proximad. Third discal line of hindwing as heavy as or heavier than first (accentuated by vein-dots).

♂. Tenth tergite rather broader than in *sinuata* and *metallica*, less convex above, apex more broadly sinuate. Harpe slenderer than in *metallica*, agreeing far better with that of *automedon* (Pl. IL. f. 2), but being shorter.

♀ and early stages not known to us.

Hab. North India: Sikhim; Bhutan.

In the Tring Museum 3 ♂♂ from: Sikhim, 1. vii. 1887 (O. Möller); Buxa, Bhutan.

462. Panacra mydon.

*♀. *Panacra mydon* Walker, *List Lep. Ins. B. M.* viii. p. 155. n. 2 (1856) (Silhet;—Mus. Brit.); Moore, *Proc. Zool. Soc. Lond.* p. 675 (1867) (Silhet); Butl., *Trans. Zool. Soc. Lond.* ix. p. 550. n. 7 (1877) (Silhet; Barrackpore); id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 5. t. 78. f. 9 (1881) (Silhet); Cot. & Swinh., *Cat. Moths Ind.* i. p. 12. n. 66 (1887) (Sibsagar); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 11. n. 47 (1892) (Silhet); Kirby, *Cat. Lep. Het.* i. p. 662. n. 3 (1892) (Silhet).

*♂. *Panacra scapularis* Walker, *l.c.* p. 157. n. 5 (1856) (Silhet; Java;—Mus. Brit.); Moore, *Proc. Zool. Soc. Lond.* p. 675 (1867) (Silhet; = *elegantulus*); Butl., *Trans. Zool. Soc. Lond.* ix. p. 551. n. 12 (1877) (Java; Silhet); Cot. & Swinh., *Cat. Moths Ind.* i. p. 12. n. 20 (1887); Kirby, *Cat. Lep. Het.* i. p. 662. n. 7 (1892) (Silhet; Java).

Choerocampa scapularis, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 282. n. 81 (1875) (Java; Ind. bor.).

Choerocampa jasion id., *l.c.* (= *scapularis*).

Choerocampa jasion var. *arachtus* id., *l.c.*

Choerocampa jasion var. *mydon* id., *l.c.*

Chaerocampa mydon, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 90. n. 133 (1892) (Sikhim; Calcutta; Silhet; Assam; Java; = *fremo*).

♂♀. The sexes rather different in colour. Mesothoracic tegula with metallic, pale golden, apical fringe, these metallic scales few in number, but large. Middle of thorax and first abdominal tergites broadly greyish clay-colour; a few white battledore-shaped scales laterally at the apices of the third to sixth tergites.

Wings somewhat scalloped, fringe heavily dotted with black.——Forewing slightly sinuate below apex; first discal line not quite straight, ending in a black costal spot situated just in front of the subcostal fork, third and fourth lines dentate, accentuated by vein-dots, generally vestigial between veins; a brown triangular marginal cloud from R^1 backwards, separating a pale, more or less triangular, area from distal margin.

Underside: brown distal border of fore- and hindwing dilated before middle; external discal line parallel to outer margin, but curving costad in front, dentate, accentuated by vein-dots.

♂. Tenth segment as in *dohertyi*, tergite a little broader. Clasper with numerous friction-scales; harpe slender, nearly as in *automedon*. Penis-sheath:

right process projecting as in *dohertyi*, but broader at end and more heavily dentate ; left process as long as in *malayana*, but broader.

Larva green or brown, a pale dorso-lateral line from head to horn, bordered brown above ; a small ocellus on fourth segment; horn first straight, in later stages short and strongly curved.—Food-plants : *Caladium ; Philodendron.*

Pupa clayish buff ; last segments see Pl. LXIV. f. 19.

Hab. Indo-Malayan Subregion, inclusive of the Philippine Islands.

Two subspecies :

a. P. mydon mydon.

*♀. *Panacra mydon* Walker, *l.c.* ; Butl., *l.c.* t. 78. f. 9 (1881).

*♂. *Panacra scapularis* Walker, *l.c.*

Choerocampa scapularis, Boisduval, *l.c.* (partim).

**Panacra frena* Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 12. n. 48. t. 1. f. 5 (♂) (1892) (Silhet ;—Mus. Oxford).

Charocampa mydon, Hampson, *l.c.* ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 411. n. 133 (1898) (Sikhim ; Bhutan ; up to 4000 ft., iii. v.—viii. ; descr. of larva & pupa ; *Aroideae*).

♂♀. Forewing much shaded with brown in both sexes, ♂ not much paler than ♀, brown distal marginal area not sharply defined.

Underside of abdomen vinaceous hazel shaded with grey, without distinct black dots.——Right process of penis-sheath scarcely longer than broad ; harpe not distinctly spatulate.

Hab. Continental India : Assam ; Sikhim ; Bhutan ; Burma ; Tonkin.

In the Tring Museum 9 ♂♂, 9 ♀♀ from : Van-bu, Tonkin ; Khasia Hills ; Northern Shan States, x. 1900 (Bingham).

b. P. mydon elegantulus.

**Panacra scapularis* Walker, *l.c.* (partim) ; Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E.I.C.* i. p. 269. n. 621. t. 9. f. 5. 5a (*l., p.*) (1857) (Java) ; Walk., *Journ. Linn. Soc. Lond.* vi. p. 84. n. 13 (1862) (Sarawak) ; Semp., *Verh. Zool. Bot. Ges. Wien* xvii. p. 699. n. 10 (1867) (Bohol, larva) ; Snell., *Tijdschr. Ent.* xx. p. 67 (1877) (Sumatra) ; Huwe, *Berl. Ent. Zeit.* xl. p. 366. n. 31 (1895) (Java).

*♂. *Thyreus elegantulus* Herrich-Sch., *Lusser. Schm.* f. 479 (1856) (Java ;— coll. Staudinger).

*♀. *Panacra regularis* Butler, *Proc. Zool. Soc. Lond.* p. 247. n. 22 (1875) (Java ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 551. n. 14. t. 92. f. 4 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 663. n. 9 (1892) (Java).

Charocampa mydon, Hampson, *l.c.* (partim); Semp., *Schmett. Philipp.* ii. p. 397. n. 35. t. v. f. 3. 4. 5 (*l., p.*) (1896) (Luzon ; Bohol ; i. ii. iv. vi viii.).

*♂. *Panacra variegata* Rothschild, Nov. Zool. i. p. 81 (1894) (Philippines ;—Mus. Tring).

*♀. *Panacra perakana* id., *l.c.* (1894) (Gunong Ijau, Perak ;—Mus. Tring).

Panacra elegantulus, Piepers, *Tijdschr. Ent.* xl. p. 98. t. 1. f. 16. 17 (horn of *l.*), p. 102. t. 4. f. 5. 6 (larva) (1897).

♂♀. Sexes obviously dissimilar, ♂ being much paler than ♀ Abdomen below creamy buff in ♂, with two rows of black dots, and a large black spot on the seventh segment, in ♀ also paler than in the Continental form, but the black dots not very distinct.——Forewing of ♂ much paler than in *mydon mydon*, the first and second discal line more prominent ; distal marginal brown area rather sharply defined in both sexes. Right process of penis-sheath longer than in the preceding ; harpe more spatulate ; tenth sternite narrower.

Hab. Malay Peninsula to Sumba and the Philippines.

In the Tring Museum 14 ♂♂, 32 ♀♀ from : Penang, xi. (Curtis) ; Perak ; Sarawak ; Kina Balu ; Kuching ; Luzon ; Java ; Lombok ; Sambawa ; Sumba.

CXXV. ANGONYX.—Typus : *testacea*.

Perigonia Walker, *List Lep. Ins. B. M.* viii. p. 100 (1856) (partim ; type : *lusca*).
Tylognathus Boisduval, *Spec. Gén. Lép. Hét.* i. p. 293 (1875) (partim ; type : *japix*).
Perigonia ? id , *l.c.* p. 329 (1875).
Angonyx id., *l.c.* p. 317 (1875) (type : *emilia* = *testacea*).
Panacra, Butler (*non* Walker, 1856), *Proc. Zool. Soc. Lond.* p. 246 (1875) ; id., *Trans. Zool. Soc. Lond.* ix. p. 550 (1877).
Agonyx (!), Cotes & Swinh., *Cat. Moths Ind.* i. p. 11. n. 2 (1887) (sub syn.).
Uzela, Kirby (*non* Walker, 1856). *Cat. Lep. Het.* i. p. 641 (1892).

♂ ♀. Genal process large, but rounded, not triangular. Palpus large, projecting, obtuse, terminal surface on a level with frons, second segment longer than first. Eye large, not lashed. Antenna long, in ♂ longer than in ♀, setiform, gradually fining to a long and gradually curved hook ; end-segment triangular, short. Spines of abdomen elongate. Spurs unequal, long terminal one at least half the length of the first tarsal segment, first segment of hindtarsus longer than that of midtarsus, and considerably shorter than tibia, both mid- and hindtarsus with comb. Apex of forewing obtusely pointed, distal margin convex before middle, sinuate in front ; apex of hindwing rounded, D^2 transverse, D^3 straight and very oblique, lower angle of cell acute.

♂. Scent-organ of forecoxa strongly developed. Tenth abdominal segment very long, narrow, simple, tergite compressed, especially at end, pointed, apex rather abruptly curved downwards ; sternite with nearly parallel sides, rather flat, evenly and slightly convex below, apex narrowed, sinuate, with the short angles curved upwards, so that the sternite appears hooked in lateral aspect. Clasper large, concave dorsally, convex ventrally, broadly sole-shaped ; an erect crest of moderately large friction-scales, lanceolate, not truncate, about 14 in number, arranged in a single row, situated at the ventral side of an ellipsoid patch of small, glossy, dentate scales ; inner surface of clasper densely clothed with long hairs ; process of harpe small, either triangular (Pl. IL. f. 13. 14), or slender and more or less spatulate or lanceolate. Penis-sheath (Pl. LV. f. 8) with a right free process curving ventrad, often round the sheath, and a shorter left process which is not separate from the sheath, both processes dentate, their ends often close together.

♀. Vaginal plate triangular, regular in shape, feebly chitinised, apex rounded, edges incrassate, orifice at the end of a stronger chitinised half-cylinder.

Larva and pupa not known.

Hab. Oriental Region.

Three species.

Key to the species :

a.	Disc of hindwing yellow	465. *A. meeki*.
	Disc of hindwing not yellow	*b*.
b.	White discal band of forewing about 4 mm. broad at R^3, or hindwing with orange rufous band	463. *A. testacea*.
	White discal band of forewing gradually shading off distally, except at costal margin, hindwing without distinct band .	464. *A. boisduvali*.

463. Angonyx testacea.

**Perigonia testacea* Walker, *List Lep. Ins. B. M.* viii. p. 102. n. 3 (1856) (*hab.*? ;—Mus. Brit.) ; d., *l.c.* xxxi. p. 29 (1864) (Ceylon).

♂♀. Individually variable. Metanotum often russet. Forewing : grey or white diseal band mostly narrow ; most specimens with black submarginal spots between R^2 and M^2, often extended to margin. Hindwing sometimes entirely blackish umber-brown, with a grey spot before anal angle, sometimes with a clearly marked orange-rufous band, which is purest in colour in individuals from the Solomon Islands. Underside russet brown, or yellow, shaded with pale green in fresh specimens. Penis-sheath see Pl. LV. f. 8.

Hab. Ceylon and North India eastwards to the Solomon Islands.

Two subspecies, which differ apparently only in the genital armature of the ♂♂.

a. A. testacea testacea.

**Perigonia testacea* Walker, *l.c.* (1856).

**Tylognathus emus* Boisduval, *l.c.* p. 294. n. 2 (1875) (Sylhet? Amer. mér.? ;—coll. Charles Oberthür).

Perigonia? testacea, id., *l.c.* i. p. 329. n. 15 (1875).

**Angonyx emilia* id., *l.c.* i. p. 318. t. 8. f. 1 (♂) (1875) (Ternate ;—coll. Charles Oberthür) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 109. n. 211 (1888) (Amboina) ; Huwe, *Berl. Ent. Zeit.* xl. p. 366. n. 33 (1895) (Java).

**Panacra ella* Butler, *Proc. Zool. Soc. Lond.* p. 246. n. 21. (1875) (Silhet ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 550. n. 3. t. 92. f. 7 (♀) (1877) (Silhet) ; Kirby, *Trans. Ent. Soc. Lond.* p. 235 (1877) (Silhet, ♂).

Panacra testacea, id., *l.c.* ix. p. 550. n. 2 (1877) (Ceylon) ; Kirby, *l.c.* (1877) (Andamans) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 11. n. 63 (1887) (Silhet ; Ceylon) ; Hamps., *Illustr. Typ. Specim. Lep. Het. B. M.* viii. p. 1. n. 16 (1891) (Nilgiris, 6000 ft.) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 13. n. 52 (1892) (Nilgiris).

Angonyx testacea, Moore, *Lep. Ceylon* ii. p. 26. t. 89. f. 1 (♂) (1882) (=*emilia*=*ella*) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 101. n. 160. f 58 (♂) (1892) (Silhet ; Nilgiris ; Ceylon) ; Kirby, *Cat. Lep. Het.* i. p. 663. n. 4 (1892) (E. Ind.).

Uzela emus, Kirby, *l.c.* p. 641. n. 2 (1892) (Silhet ?).

Harpe (Pl. IL. f. 13) ending in a conical process which bears one tooth on the underside and is finely granulose beneath proximally.

Hab. Ceylon and North India to the Moluccas.

In the Tring Museum 5 ♂♂, 5 ♀♀ from : Khasia Hills ; Java merid., 1500 ft. (Fruhstorfer) ; Amboina, ii. viii. (Doherty).

b. A. testacea papuana subsp. nov.

Panacra testacea, Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 9. n. 13 (1891) (partim ; Cairns).

Angonyx testacea, Pagenstecher, in Chun, *Zoologica* xii. 29. p. 16. n. 15 (1900) (Kinigunang).

Harpe (Pl. IL. f. 14) ending in a very slender process, which is often somewhat lanceolate or spatulate, and has the hinder edge (ventral in figure) serrate.

The ♂ from New Pommern has a non-dentate harpe. We have no ♂ from the Solomon Islands ; all our ♀♀ from there have a conspicuous orange-rufous band on the hindwing.

Hab. Queensland, Tenimber Islands ; eastward to the Solomon Islands.

In the Tring Museum 8 ♂♂, 7 ♀♀ from : Queensland ; Selaru, Tenimber Is., iii. iv. (Micholitz) ; Ron I., Geelvink Bay, vii. (Doherty) ; Milne Bay, Brit. N. Guinea, ii. (Meek) ; Kinigunang, N. Pommern (Ribbe) ; Florida, i., and Guadalcanar, v., Solomon Is. (Meek).

Type : ♂, Cedar Bay, Queensland.

464. **Angonyx boisduvali** (Pl. II. f. 11, ♂).

**Angonyx boisduvali* Rothschild, Nov. Zool. i. p. 82 (1894) (♀, Guadalcanar ;—Mus. Tring) ; id., *l.c.* iii. t. 14 f. 14 (♀) (1895).

♂♀. Larger than *testacea*, more uniform in colour, greenish grey, greyish white discal area of forewing gradually fading away distally between R^2 and hinder margin, no black submarginal spots R^2—M^2 ; hindwing much paler, greenish grey from base to discal line, outside this more or less cinnamon. Underside of wings pale greenish grey.

♂. Harpe nearly as in *A. testacea papuana*, rather more regularly lanceolate, and tenth tergite less abruptly bent downwards.

Hab. Solomon Islands.

In the Tring Museum 10 ♂♂, 2 ♀♀ from : Guadalcanar ; Florida, i. ; Isabel, vi. vii. ; Kulambangra, ii. (Meek and Eichhorn) ; Shortlands (Ribbe).

465. **Angonyx meeki** spec. nov. (Pl. II. f. 6, ♂).

♂. In size and shape like *testacea*, but hindwing yellow, with a brown distal border, which is sinuate in middle, and an ill-defined basi-discal brown patch between cell and abdominal margin. Underside of wings yellow from base to disc, forewing with a blackish brown spot upon cross-veins, longitudinal, no brown cloudy patch on disc behind cell. Harpe as slender as in the preceding, but distinctly spatulate ; tenth tergite as in *testacea*, sternite less sinuate.

Hab. Solomon Islands.

In the Tring Museum 15 ♂♂ from : Guadalcanar, April, *type* ; Florida I., January ; Kulambangra, February ; collected by Messrs. A. S. Meek and Eichhorn ; Bougainville (Ribbe) ; Guadalcanar (Woodford)

CXXVI. ENPINANGA gen. nov.—Type : *vigens*.

Panacra Walker, *List Lep. Ins. B. M.* viii. p. 154 (1856) (partim ; type : *automedon*).
Angonyx, Butler (*non* Boisduval, 1875), *Trans. Ent. Soc. Lond.* p. 261 (1879).
Chaerocampa, Hampson (*non* Duponchel, 1835), in Blanf., *Fauna Brit. Ind., Moths*, i. p. 90 (1892).

♂♀. Differs from *Angonyx* in the following characters. Palpus and eye smaller ; antenna much shorter in both sexes than the cell of the forewing ; first segment of foretarsus much shorter than foretibia ; spurs short, longer terminal one of hindtibia about one-third the length of the first tarsal segment, this not shorter than the first midtarsal segment ; comb of the latter less distinct than in *Angonyx*.

♂. Tenth segment much shorter than in *Angonyx* ; tergite slender, slightly curved, not compressed ; sternite broader than tergite, much shorter, truncate-sinuate. Clasper short, rounded sole-shaped, dorsal margin rounded dilated, concave at base ; seven to nine large truncate friction-scales, arranged in three rows, situated in a depression. Penis-sheath with one dentate process projecting distad.

Early stages not known.

Hab. Indo-Malayan Subregion.

Four species :

· Forewing with two black contiguous patches behind costal margin, the external one being the costal portion of a discal band which is vestigial between R^2 and M^1. . 466. *E. vigens*.

As before, no pale patch R^3–M^1 on underside of forewing . . . . . 467. *E. assamensis*.

No distinct band between external patch and hinder margin . . . . . 468. *E. borneensis*.

A broad but not sharply defined discal band from costal to inner margin . . . 469. *E. labuana*.

466. **Enpinanga vigens** (Pl. LXVI. f. 6, ♂).

**Angonyx vigens* Butler, *Trans. Ent. Soc. Lond.* p. 262 (1879) (Philippines;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 664. n. 7 (1892).

Angonix (!) *virens*, Semper, *Schm. Philipp.* ii. p. 403. n. 50 (1896) ("not rec.").

♂. Butler meant to name this species *virens*, as the label of the type proves. ——Distal margin of forewing crenulate beyond R^3; external costal patch narrower than in *borneensis*, continued backwards by a line which is first faint but becomes prominent beyond M^1.——Hindwing more distinctly dentate than in *borneensis*.

Underside: less uniform in colour and distal marginal band more prominent than in the following, disc of forewing broadly clay-colour at this band.

♂. Tenth tergite slightly spatulate, feebly curved; sternite shallowly sinuate at end. Harpe produced into a slender, acute, curved process (Pl. LL. f. 15). Penis-sheath armed with a spatulate dentate process which projects far beyond the mouth of the sheath (Pl. LV. f. 9).

Hab. Philippines; Borneo; Penang; probably more widely distributed in the Indo-Malayan Subregion.

In the Tring Museum 2 ♂♂ from: Kina Balu, N. Borneo (Waterstradt); Penang (C. Curtis).

467. **Enpinanga assamensis**.

**Panacra assamensis* Walker, *List Lep. Ins. B. M.* viii. p. 160. n. 9. (1856) (Silhet;—Mus. Brit.); Moore, *Proc. Zool. Soc. Lond.* p. 675 (1867) (Silhet); Boisd., *Spec. Gén. Lép. Hét.* i. p. 287. n. 4 (1875): Butl., *Trans. Zool. Soc. Lond.* ix. p. 550. n. 4 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 11. n. 64 (1887).

Angonyx assamensis, Kirby, *l.c.* p. 664. n. 5 (1892) (Silhet).

Chierocampa assamensis, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 90. n. 134 (1892) (partim; Silhet; *borneensis* is a race of *ass.*).

♂. Only one bad specimen known.——Forewing somewhat dentate, as in *vigens*; a line behind the external costal spot; no clayish patch R^3—M^1 on underside of forewing. Penis-sheath as in the following. Harpe more like that of the preceding. Perhaps only a form of the preceding.

Hab. Silhet.

468. **Enpinanga borneensis**.

**Angonyx borneensis* Butler, *Trans. Ent. Soc. Lond.* p. 261 (1879) (Borneo;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 664. n. 6 (1892).

♂ ♀. No pale postdiscal patches on underside of forewing.

♂. Tenth tergite stronger curved at end than in the previous species; sternite less obviously sinuate. Harpe short, variable individually, generally obliquely truncate (Pl. LL. f. 16). Process of penis-sheath (Pl. LV. f. 10) short.

Hab. Malacca; Borneo; probably all over the Indo-Malayan Subregion.

In the Tring Museum 14 ♂♂ from: Sandakan, N. Borneo, ii. iii. v. vii. (D. Cator); Gunong Ijau, Perak, 2000—3000 ft., iii. '98 (Butler).

469. Enpinanga labuana.

**Daphnis labuana* Rothschild, *Iris* vii. p. 299. t. 5. f. 3 (♀) 1894) (Labuan ;—coll. Staudinger).

♀. The similarity with *borneensis* and *rigens* is, apart from structure, especially evident on the underside, where the abdomen has the red and creamy lateral dots of *borneensis*, and the forewing a similar brown border and a costal patch of short discal undulate lines.

Hab. Borneo.

Three ♀♀ known to us, one from Labuan in coll. Staudinger (*type*), another from "Borneo" in the K. K. Hofmuseum in Vienna, a third in the Tring Museum from North Borneo (D. Cator).

CXXVII. RETHERA gen. nov.—Typus : *komarovi*.

Deilephila, Christoph (*non* Laspeyres, 1809), in Rom., *Mém. Lép.* ii. p. 169 (1885).
Choerocampa, Swinhoe (*non* Duponchel, 1835), *Trans. Ent. Soc. Lond.* p. 346 (1885).
Theretra, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 660 (1892).

♂. Genal process large, triangular; a tuft of scales beneath it (scales of labial palpus). Palpus obtuse, rounded in dorsal and in lateral aspect. Head with indication of crest. Eye lashed, but not heavily. Antenna incrassate before hook; this rather abrupt, not compressed, with the seriated ciliae (♂) vestigial : end-segment three times the length of the previous, but not produced into a filiform process. Spur of foretibia reaching beyond tip of tibia; mid- and hindtibial spurs unequal, longer ones less than half the length of the respective first tarsal segments; these without comb : first hindtarsal segment longer than first midtibial one, and about as long as the hindtibia; *no* pulvillus, *no* paronychium. Wings entire; SC^2 and R^1 of hindwing on a stalk.

♂. Tenth segment elongate, simple ; tergite and sternite horizontal, little curved, both obtuse. Clasper elongate sole-shaped; a patch of rather small, truncate, friction-scales; harpe ending in an obtuse process with parallel sides and concave upper surface (Pl. IL. f. 12). Penis-sheath with an oblique series of teeth (Pl. LV. f. 11).

♀. Not known to us.

Early stages not known.

Hab. Western Asia.

One species.

470. Rethera komarovi.

Deilephila komarovi Christoph, in Rom., *Mém. Lép.* ii. p. 169. t. 15. f. 2. a. b (♀) (1885) (Askhabad ; near *Cizara*) ; id., *l.c.* iii. p. 54 (1887) (= *stipularis*) ; id., *l.c.* v. p. 11. n. 37 (1889) (Germol); id., Bartel, in Rühl, *Grossschm.* ii. p. 130 (1900) (Borshom, v.—vii.).
**Choerocampa stipularis* Swinhoe, *Trans. Ent. Soc. Lond.* p. 346. n. 6. t. 9. f. 1 (1885) (Choman, May ;—Mus. Brit.).
Choerocampa stipularis, Cot. & Swinh., *Cat. Moths Ind.* i. p. 16. n. 87 (1887).
Theretra komarovi, Kirby, *Cat. Lep. Het.* i. p. 660. n. 115 (1892).
Choerocampa komarovi, Standinger & Reb., *Cat. Lep.* ed. iii. p. 103. n. 760 (1901) (Pont.; Taur. ; Arm. ; Tura ; Afghanist.).

♂. Individually somewhat variable. In the pattern of the body and wings close to *Cizara*.

Hab. Afghanistan westwards to Amasia, northwards to Transcaucasia.

In the Tring Museum 2 ♂♂ from : Askhabad ; Amasia.

CXXVIII. CIZARA.—Typus : *ardeniae*.

Sphinx, Lewin (*non* Linné, 1758), *Prodr. Ent.* p. 3 (1805).
Deilephila, Boisduval (*non* Laspeyres, 1809), *Voy. Astrolabe, Lép.* p. 183 (1832).
Cizara Walker, *List Lep. Ins. B. M.* viii. p. 120 (1856) (type : *ardeniae*).
Zonilia, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 148 (1875).
Microlophia Felder (*non* Newman, 1842), *Reise Novara, Lep.* t. 75 (1874 (*nom. indescr.*); Boisd., *l.c.* p. 329 (1875) (type : *sculpta*).
Abrisa Kirby, *Cat. Lep. Het.* i. p. 641 (1892) (type: *sculpta*).
Angmyx, Hampson (*non* Boisduval, 1875), in Blanf., *Fauna Brit. Ind., Moths* i. p. 102 (1892).

♂ ♀. Closely allied to *Enpinanga*, but eye heavily lashed, genal process triangular, first segment of hindtarsus as long as segments 2 to 5 together, clasper without friction-scales.

Larva (of *ardeniae*) tapering in front, minutely dotted with white all over; head, pronotum and the large horn granulose ; a pale dorso-lateral line from head to horn, bordered with brown ; five anterior segments and part of sixth black or brown ventrally and laterally up to that line, a broad oblique band on ninth segment and the side of the tenth and eleventh the same colour, four pale oblique side-lines on segments 6 to 10, beginning at the dorso-lateral line and running downwards and backwards to the next segment.—Food-plant : *Grevillea*.

Pupa known to us only from Lewin's figure.

Hab. Oriental Region.

Two species, both with a green forewing which is traversed by a sharply marked white band and bears within this a large semitransparent stigma.

Basal area of hindwing yellow . . . . 472. *C. sculpta*.
Basal area of hindwing not yellow . . . . 471. *C. ardeniae*.

471. Cizara ardeniae.

Sphinx ardeniae Lewin, *l.c.* p. 3. t. 2. f. 1. a—d (*l., p., i.*) (1805) ; Thon, *Ent. Arch.* i. p. 5 (1829).
Deilephila ardeniae (!), Boisduval, *Voy. Astrolabe, Lép.* p. 183. n. 1 (1832).
Cizara ardeniae Walker, *List Lep. Ins. B. M.* viii. p. 120. n. 1 (1856) (Austral.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 552 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 648. n. 1 (1892) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 14. n. 56 (1892) (Moreton Bay).
Zonilia ardenia (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 148 n. 17 (1875) (Sydney).
Cizara ardenia (!), Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 10. n. 14 (1891) (Sydney ; Brisbane).

♂ ♀. Antenna long and slender in both sexes. Abdominal spines strong. D^3 of hindwing barely twice the length of D^4. There is little variation in the colour of this species.

♂. Tenth tergite compressed, gently curved, pointed, not distinctly hooked ; sternite broader, not much narrowed to end, apex rounded, but appearing sinuate in distal aspect owing to the lateral edges being turned upwards and somewhat dilated just before apex. Clasper elongate sole-shaped, dorsal margin concave; harpe as in *Rethera komarovi* but slenderer, very much slenderer than in *sculpta*. Penis-sheath (Pl. LV. f. 12) produced into a prominent pointed apical process of rather variable width, curved towards the right side and bearing a tooth at the proximal edge.

♀. Vaginal plate shaped as in *Deilephila* ; orifice large, surrounded in front and at the sides by a ridge which is broadly sinuate mesially (Pl. XLI. f. 18).

Larva see above.

Hab. Australia: Queensland and New South Wales.

In the Tring Museum 9 ♂♂, 6 ♀♀ and 2 larvae from Queensland: Mackay, xi. (Turner); Toowoomba, i. (Dodd).

472. Cizara sculpta.

**Microlophia sculpta* Felder, *Reise Novara, Lep.* t. 75. f. 9 (♂) (1874) (Siam;—Mus. Tring); Boisd., *Spec. Gén. Lép. Het.* i. p. 330 (1875) (Siam); Butl., *Trans. Zool. Soc. Lond.* ix. p. 552 (1877) (S. India); Cot. & Swinh., *Cat. Moths Ind.* i. p. 13. n. 76 (1887) (type in coll. F. Moore ex err. !).
Abrisa sculpta, Kirby, *Cat Lep. Het.* i. p. 641. n. 1 (1892).
Angomyx sculpta, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 102. n. 161 (1892) (Siam; S. India).

♂. First segment of palpus rather more obviously incrassate at end than in *ardeniae*, subangulate. Antenna much shorter and also slenderer. D^3 of hind-wing very oblique, three times as long as D^4, lower angle of cell more acuminate than in the previous species.

♂. Tenth tergite not compressed, rather slightly convex above, hollow beneath, narrowed in middle, being slightly dilated from middle to apex, which is feebly sinuate; sternite short, triangular, acuminate. Clasper of almost even width from before middle to apex, ventral margin slightly convex, apex rounded; harpe rather large (Pl. IL. f. 11), of about the same shape as in *ardeniae*, but much broader, the process situated below the ventral edge of the clasper. Penis-sheath (Pl. LV. f. 13) ending in a prominent forked process, which projects distad.

♀. Not known.

Early stages not known.

Hab. Siam and South India; probably of wider distribution in the Indo-Malayan Subregion.

In the Tring Museum 1 ♂ (*type*) from Siam (coll. Felder).

CXXIX. MAASSENIA.—Typus: *heydeni*.

Zomilia, Saalmüller (*non* Walker, 1856), *Ber. Senk. Nat. Ges.* p. 89 (1878).
Sphinx, Mabille, *Ann. Soc. Ent. France* p. 295 (1879).
Maassenia Saalmüller, *Lep. Madag.* p. 126 (1884).

♂♀. Differs from *Nephele* essentially in the slenderer antenna, the end-segment of which is not produced into a filiform process, being elongate-triangular, compressed; the non-spinose spurs; and in the somewhat undulated distal margin of the forewing.

♂. Tenth tergite as in *Nephele*, pointed; sternite not much shorter than tergite, minutely sinuate, resembling the sternite of *Acosmeryx*. Clasper with a patch of large friction-scales, arranged in several ill-defined rows; harpe of the type found in *Acosmeryx*, being dilated at end and armed with spine-like teeth (Pl. IL. f. 21). Penis-sheath (Pl. LV. f. 34) with an indication of an apical process; penis-funnel with broad, truncate, apically dilated, ventral lobe, which is clothed at end with very short hairs.

Early stages not known.

Hab. Madagascar.

One species.

This genus combines characters of *Nephele* and *Acosmeryx*.

473. Maassenia heydeni.

Zonilia heydeni Saalmüller, *Ber. Senk. Nat. Ges.* p. 89 (1878).
Sphinx heydeni, Mabille, *Ann. Soc. Ent. France* p. 295 (1879) (Madag.).
Maassenia heydeni Saalmüller, *Lep. Madag.* p. 126. n. 299. t. 3. f. 38 (1884) (Nossi-bé) ; Kirby, *Cat. Lep. Het.* i. p. 681. n. 1 (1892).

♂ ♀. Besides the angulifórm silvery mark on the forewing, there is sometimes a silvery dot upon D^4 in front of the base of M^1.

Hab. Madagascar.

In the Tring Museum 4 ♂♂, 1 ♀ from : Madagascar.

CXXX. NEPHELE.—Typus : *didyma*.

Sphinx, Fabricius (*non* Linné, 1758), *Syst. Ent.* p. 543 (1775) (partim).
Nephele Hübner, *Verz. bek. Schm.* p. 133 (1822) (type : *morpheus* = *didyma*).
Deilephila, Boisduval (*non* Laspeyres, 1809), *Faune Madag. Bourbon* p. 71 (1833) (partim).
Zonilia Walker, *List Ins. B. M.* viii. p. 192 (1856) (partim ; type : *funebris*=*viridescens*).

♂ ♀. Patch of fine hairs at each side of base of tongue conspicuous. Genal process acuminate, longer than pilifer. Palpus prominent, second segment widened from base to apex, rounded-truncate at end ; inner surface of first segment carinate ventrally. Eye large. Antenna slightly clubbed in ♀, not incrassate distally in ♂, end-segment long, rough-scaled. Spines of abdominal tergites and sternites numerous, in several rows, all elongate, flattened, strong ; ♂ with three-cornered anal tuft, ♀ with a simple truncate one, which consists, as in ♂, of stiff (mostly reddish) brittle scales. Forecoxal scent-organ of ♂ feebly developed; legs slender, hindtibia with dorsal and ventral scaling prolonged, the tibia appearing compressed; first protarsal segment with external row of spines doubled or trebled ; comb of mid- and hindtarsus strongly developed, the spines of hindtarsal comb long ; spurs very unequal, the short *spur* of midtibia and the short terminal one of hindtibia with a *comb* of stout spines, which extends on the midtibial spur from the base to the naked apical point, while it is more reduced on the hindtibial spur (Pl. LXIV. f. 8) ; fifth tarsal segment shorter than fourth ; hinder edge of mesum of midcoxa carinate, subangulate. Distal margin of forewing entire ; D^2 of hindwing curved or angulate.

♂. Sexual armature nearly the same in all the species ; no appreciable difference in these organs between allied species. Tenth tergite very slender, simple, curved downwards, long ; sternite short, horizontal, with almost parallel sides and rounded apex, not strongly chitinised (Pl. XLIV. f. 29. 30). Clasper sole-shaped ; large friction-scales arranged in one or two rows (Pl. LVIII. f. 38) ; harpe (Pl. IL. f. 36) ending in a sharply pointed, more or less evenly curved hook. Penis-sheath (Pl. LV. f. 35) armed at end with two dentate processes, the proximal one long, curving round the mouth of the sheath (as in several *Macroglossum*), the other short and obtuse ; the armature reminding strongly of that found in *Macroglossum*.

♀. Eighth tergite truncate-sinuate. Vaginal plate small, weakly chitinised, excepting postero-lateral edges which are somewhat incrassate ; orifice free, a little projecting. Seventh sternite broader than long, apical margin short, with strongly rounded angles.

Larva green or reddish brown. We have four stages of the larva of *N. accentifera* from Mr. Leigh, Durban.

First stage (one specimen): green, a reddish shade from horn to thorax; fading away in front; horn black, paler towards end. Head large; thoracic segment not smaller than following; five bristles: two dorso-lateral, one above stigma, two ventro-lateral; horn about half the length of the body, curved upwards, densely hairy, sinuate at tip, each angle with a stout bristle.

Second stage (one specimen): head large, thoracic segments somewhat smaller than the following ones; horn reduced in length, densely tuberculated, reddish, tip pale, sinuate; upperside greenish, rest of body reddish; head pale frontally, with a pale lateral line; a pale line from horn to eighth segment, widening behind; densely covered with pale dots.

Third stage (one specimen): pale-dotted, reddish; pro- and mesothorax small, metathorax enlarged; a dark dorso-mesial line; pale line from horn frontad bordered by deeper red above and below, triangularly widening behind, a pale oblique side-stripe over segments 4 and 5; horn curving upwards, obtusely pointed, granulose.

Fourth stage (two specimens, one green, one brown): strongly tapering from fourth segment frontad; pale-dotted; markings as before; horn stout, 6 mm. long, depressed, somewhat ∽-shaped, of even width, suddenly narrowed at end to a short point (which is dorsal), tubercles numerous but small.

The larvae of the Oriental species are very close to that here described.—Food-plant: *Carissa* (in India).

Pupa long, pale brown: spiracles, an interrupted mesial line above and below, cremaster and a series of ventro-lateral abdominal spots brown: glossy; tongue-case projecting forward, compressed, the frontal part (from eye onwards) about twice as long as the head vertically high, no ventral carina; labrum flat; clypeus convex; abdomen densely rugate-punctate above, more dispersedly punctured beneath; praespiracular area of fourth and fifth somites rough with short carinae, corresponding to the raised anterior edges of the umbilicate punctures of the following segments; cremaster short, broadly triangular, rugate, ending in two strong points which curve upwards.

Hab. Aethiopian and Oriental Region.

Fifteen species, two Oriental, the others Aethiopian.

Most of the species resemble each other closely in pattern. The antemedian and discal lines of the forewing are disposed as in most *Macroglossum*. Nearly all the species occur in two forms, one with, one without white spot or spots on the forewing. Owing to the variation in these spots, the absence, in some species, of very striking distinguishing characters in pattern, and the great similarity, or practically identity, in the sexual armature, the determination of the species presents great difficulties.

The forms with the white spots developed are the easiest to discriminate, and we advise the reader who is trying to name some obscure species of *Nephele* to begin with spotted individuals, and then compare the not spotted ones with them.

The variously formed stigma of the forewing is derived from four white dots; the development of these in some species is illustrated on Pl. LXV. Dot 1 is situated in the cell upon the fold corresponding to R^2, dot 2 at upper angle of cell upon D^2, dot 3 at lower angle of cell upon D^3, and dot 4 at R^3 outside cell; in the

allied genus *Maassenia* there is often a small dot present behind R^3. The four dots are all marked in *N. densoi* (Pl. LXV. f. 4).

The distal marginal area of the forewing is generally limited by a curved line running from apex to hinder angle ; this line, which we call postdisco-submarginal, is composed of a submarginal line and a postdiscal one joining each other : the free costal portion of the postdiscal line is often vestigial.

Key to the species :

a. Forewing, above, with a white submarginal line forming a right angle with an obliquc white line crossing wing from middle of costal margin to hinder angle. 487. *N. rectangulata.*

Forewing with a black band from middle of costal margin to hinder angle ; abdomen without black side-patches . 488. *N. aequivalens.*

Abdomen with black side-patches . . . . *b.*

b. Forewing with a white curved discal and a white antemedian band, converging posteriorly ; stigma large, triangular . 483. *N. argentifera.*

Forewing with a straight discal band which is at right angles to hinder margin . . . . *e.*

Forewing without that band . . . . . *d.*

c. The band edged with white proximally, 4 mm. from lower angle of cell . . 486. *N. rosae.*

The band edged with white proximally, at least 6 mm. from lower angle of cell . 485. *N. oenopion.*

The band not edged with white proximally; stigma consisting of several dots . . 484. *N. densoi.*

d. A large triangular brown discal area on forewing, inner edge obliqne, outer edge sharply marked, qnite straight from R^2 to hinder margin of wing, stigma V-shaped 476. *N. rau.*

A blackish band across wing from middle of costa to distal margin before angle, space between this band and distal margin blackish, excepting patches in costal area, contrasting sharply with middle area of wing ; no stigma . . 479. *N. bipartita.*

Forewing not so ; with or without stigma . . . . *e.*

e. Postdisco-submarginal line straight from R^2 backwards, sharply marked . . . . *f.*

Postdisco-submarginal line obviously dentate; irregular, often very feebly marked . . *b.*

Forewing with sharply defined clayish patch in middle of hinder margin . . . 480. *N. discifera.*

f. Comb of short terminal spur of hindtibia vestigial ; Oriental species . . . . . *g.*

Comb of short terminal spur of hindtibia well developed ; African species . . 477. *N. comma.*

g. Hindwing bright ferruginous . . .	475.	*N. subcaria.*
Hindwing olive-russet, or raw umber colour	474.	*N. didyma.*
h. Antemedian pair of lines of forewing, above, and first and second discal line conspicuous, more or less filled in with black, interspace between second and feeble third discal line grey in front and behind, postdisco-submarginal line suddenly projecting basad between R^2 and R^3 to near third discal line; no blackish shadowy band from costal margin to hinder angle	482.	*N. accentifera.*
Forewing with feeble blackish shade from costal margin to hinder angle, or very uniform in colour		*i.*
i. Palpus below scaled white and black (or brown), contrasting with the breast .	478.	*N. funebris.*
Palpus below of nearly the same dark colour as breast and abdomen . .	481.	*N. peneus.*

Key to the forms with stigma of *N. peneus*, *comma*, *accentifera*, *funebris*:

a. One comma-shaped spot, upon cross-veins, widest behind . . .	477.	*N. comma.*
One ovate spot upon cross-veins .	478.	*N. funebris maculosa.*
Two or three spots, often confluent.		*b.*
b. A triangular spot along R^3 pointing distad, another above it . .	478.	*N. funebris funebris.*
Three spots placed in a half-ring, second and third often confluent, third at R^3	481.	*N. peneus.*
Three spots, 1 in cell, 2 and 3 upon cross-veins, one above the other .	482.	*N. accentifera.*

474. **Nephele didyma.**

**Sphinx didyma* Fabricius, *Syst. Ent.* p. 543. n. 23 (1875) (Ind. or.;—Mus. Brit.).

Nephele didyma, Hübner, *Verz. bek. Schm.* p. 133. n. 1433 (1822) (partim); Kirby, *Cat. Lep. Het.* i. p. 680. n. 16 (1892) (India; "Austral." *alia spec.*).

Zonilia morpheus Cramer, *Pap. Exot.* ii. p. 84. t. 149. f. D (1777) (Coromandel); Walk., *List Lep. Ins. B. M.* viii. p. 194. n. 5 (1856) (Nepaul; Landoor; N. India; Canara; Ceylon; "Australia" *alia spec.*); Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 269. n. 619 (1857) (Dukhun; N. India; Canara; Ceylon); id., *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal = *obliterans*); Boisd., *Spec. Gén. Lép. Het.* i. p. 139. n. 1 (1875) (larva: "Madagascar" *alia spec.*).

Nephele hespera, Butler, *Trans. Zool. Soc. Lond.* ix. p. 624. n. 14. t. 91. f. 20. 21 (*l. p.*) (1877) ("Australia" *error loci*); Moore, *Lep. Ceylon* ii. p. 2. t. 72. f. 1. 1 a. b (*l. i*) (1882); Swinh., *Proc. Zool. Soc. Lond.* p. 287. n. 4 (1885) (Poona, vii. ix.—xi.; Sattera, vi. xi.; Bombay, x.—xii.); Swinh., *l.c.* p. 435. n. 17 (1886) (Mhow, iv.—vi.); Cotes & Swinh., *Cat. Moths Ind.* i. p. 34. n. 185 (1887); Swinh., *Journ. Bombay N. H. Soc.* iii. p. 119. n. 15 (1888) (Kurachi, viii.; = *chiron* = *didyma* = *morpheus* = *obliterans*); Warr., *Proc. Zool. Soc. Lond.* p. 293. n. 1 (1888) (Campbellpore, vi.); Swinh., *Trans. Ent. Soc. Lond.* p. 165. n. 24 (1890) (Mandalay); Hamps., *Illustr. Typ. Specim. Lep. Het. B. M.* viii. p. 2. n. 33 (1891); Swinh., *Cat. Lep. Het. Mus. Ox.* i.

p. 34. n. 136 (1892) (Canara ; Bengal ; Ceylon) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 108. n. 172 (1892) (India ; Ceylon) ; Dndg., *Journ. Bombay N. H. Soc.* xi. p. 416. n. 172 (1898) (Sikhim, 1800 ft., iii. iv.).

Nephila (!) *hespera*, Butler, *Proc. Zool. Soc. Lond.* p. 379. n. 96 (1886) (Campbellpore, xi.).

♂♀. The two Indo-Australian species (which may eventually prove to be geographical forms of one species only) differ from nearly all the others in the short terminal spur of the hindtibia being provided with few and rather thin spines only, which stand in the distal half of the spur ; comb of hindtarsus also less developed than in the African species of *Nephele*.——Hindwing raw umber colour, with a tint of russet, or more russet : outer marginal area darker in tint.

There are two forms :—

a'. N. didyma f. *didyma*.

Sphinx didyma Fabricius, *l.c.* ; Goeze, *Ent. Beytr.* iii. 2. p. 207. n. 14 (1780) ; Fabr., *Spec. Ins.* ii. p. 148. n. 41 (1781) (syn. excl.) ; id., *Mant. Ins.* ii. p. 96. n. 45 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2381. n. 79 (1790) (syn. excl.) ; Fabr. *Ent. Syst.* iii. 1 p. 371. n. 48 (1793) (syn. excl.)

Sphinx morpheus Cramer, *l.c.* ; Goeze, *l.c.* p. 224. n. 75 (1780).

Nephele morpheus, Hübner, *Verz. bek. Schm.* p. 133. n. 1432 (1822).

Sphinx quaterna Charpentier, in Esp., *Ausländ. Schm., Zus.* t. 1. f. 2 (1830).

Nephila (!) *hespera* var. *morpheus*, Butler, *Proc. Zool. Soc. Lond.* p. 379. n. 96 (1886) (Campbellpore, xi.).

♂♀. Forewing with two silvery spots, separated by D^3, the second the larger, somewhat elongate and curved, the first rounded ; there is, besides, often a small dot in upper angle of cell.

b'. N. didyma f. *hespera*.

Sphinx hespera Fabricius, *Syst. Ent.* p. 546. n. 33 (1875) (Ind. or.) ; Goeze, *l.c.* p. 208. n. 18 (1780) ; Fabr., *Spec. Ins.* ii. p. 152. n. 54 (1781) ; id., *Mant. Ins.* ii. p. 91. n. 59 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2384. n. 87 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 372. n. 49 (1793) ; Auriv., *Ent. Tidskr.* xviii. p. 152 n. 82 (1897).

Sphinx chiron Cramer, *Pap. Exot.* ii. p. 62. t. 137. f. E (1777) (Coromandel) ; Goeze, *l.c.* p. 222. n. 67 (1780).

Nephele chiron, Hübner, *l.c.*, p. 133. n. 1434 (1822).

Zonilia chiron, Walker, *l.c.* viii. p. 196. n. 8 (1856) ; Boisd., *l.c.* p. 145. n. 11 (1875).

Zonilia peneus, Walker, *l.c.* viii. p. 193. n. 2 (1856) (sub syn.).

Perigonia obliterans Walker, *l.c.* xxxi. p. 28 (1864) (N. Hindostan).

Nephele thyron (!), Smith, *Trans. Amer. Ent. Soc.* xv. p. 60 (1888).

♂♀. Forewing without silvery spots, or only with a minute dot.

Hab. Ceylon to North West India, eastwards to Java.

In the Tring Museum :—

f. *didyma* 13 ♂♂, 11 ♀♀ from : Ceylon ; Canara ; Peermaud ; Nilgiris : Sabathu ; Radakheit ; Java.

f. *hespera* 11 ♂♂, 6 ♀♀ from : Ceylon ; Nilgiris ; Dalhousie ; Sikhim ; Bombay ; Burma ; Penang ; Java.

No representative of *Nephele* has as yet been found in Borneo, the Philippines, Celebes, the Moluccas, the lesser Sunda Islands, New Guinea and neighbouring groups of islands. In this area occurs perhaps a form connecting *didyma* with *subvaria*.

475. Nephele subvaria.

**Zonilia subvaria* Walker, *List Lep. Ins. B. M.* viii. p. 196. n. 9 (1856) (Australia ;—Brit. Mus.) : Misk., *Proc. Roy. Soc. Queensld.* viii. p. 26. n. 45 (1891) (Swan R. ; Brisbane ; Rockhampton).

♂ ♀. Differs from *didyma* in the upperside of the hindwing and the basal half or two-thirds of the underside of the forewing (excepting costal area) being ferruginous.

Larva (adult): pale side-band conspicuous, reaching from apex of fourth segment to middle of sixth.

There are two forms, as in *didyma*:

a'. N. subcaria f. *subcaria.*

**Zonilia subcaria* Walker, *l.c.*; Boisd., *Spec. Gén. Lép. Hét.* i. p. 143. n. 6 (1875) (Swan R.).
Zonilia antipoda Walker, *l.c.* xxxi. p. 34 (1864); Boisd., *l.c.* p. 143. sub n. 6 (1875).
Nephele subcaria, Butler, *Trans. Zool. Soc. Lond.* ix. p. 624. n. 15 (1877); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 35. n. 137 (1892) (Cape York); Kirby, *Cat. Lep. Het.* i. p. 680. n. 19. (1892) (Austral.).
Nephele hespera, Hampson. in Blanf., *Fauna Brit. Ind., Moths* i. p. 108. n. 172 (1891) (partim).

♂ ♀. With silvery spot on forewing (Pl. LXV. f. 15). The spot within cell and that outside D^3 are generally completely fused to a long curved comma-shaped mark, which is preceded by a white dot: in one of our specimens this dot also joins the comma.

b'. N. subcaria f. *metapyrrha.*

**Zonilia metapyrrha* Walker, *l.c.* viii. p. 196. n. 10 (1856) (Moreton Bay;—Mus. Brit.); Boisd., *l.c.* p. 143. n. 7 (1875).
**Deilephila dalii* Newman, *Trans. Ent. Soc. Lond.* (2). iv. p. 54 (1857) (Mus. Brit.).
Nephele metapyrrha, Butler, *l.c.* ix. p. 625. n. 16 (1877); Swinh., *l.c.* n. 138 (1892) (Moreton Bay); Kirby, *l.c.* p. 681. n. 20 (1892) (Austral.).

♂ ♀. Forewing without a silvery spot, or only with a minute dot.

Hab. Australia: Queensland.

Both forms in the Tring Museum: 2 larvae, 15 ♂♂, 13 ♀♀ from: Mackay; Dawson R.; Brisbane; Cape York.

476. Nephele vau.

**Zonilia vau* Walker, *List Lep. Ins. B. M.* viii. p. 197. n. 11 (1856) (hab.?;—Mus. Brit.); Oberth., *Ann. Mus. Civ. Genova* xv. p. 172. n. 62 (1879) (Abyss.; = *raffrayi*).
**Zonilia schimperi* Lucas, *Ann. Soc. Ent. France* p. 605. t. 13. f. 1 (1857) (Abyss.;—Mus. Paris).
Nephele vau, Butler, *Trans. Zool. Soc. Lond.* ix. p. 625. n. 17 (1877) (= *schimperi*; Abyssinia); Kirby, *Trans. Ent. Soc. Lond.* p. 239 (1877) (Ambriz, Congo); Möschl., *Abh. Senk. Naturf. Ges.* xv. p. 71. n. 160 (1890) (Accra); Kirby, *Cat. Lep. Het.* i. p. 680 n. 17 (1892) (Congo; Abyss.).
**Zonilia raffrayi* Oberthür, *Et. d'Ent.* iii. p. 31. t. 3. f. 2 (1878) (Abyss.; coll. Charles Oberthür).

♂ ♀. The short terminal spur of the hindtibia has the comb as feebly developed as in the Oriental species. Mesothoracic tegula with a thin grey fringe; black lateral patches of abdomen reduced in size. Underside of body pinkish, a pinkish tint also often on wings. The silvery mark of the forewing is V-shaped and generally somewhat yellowish (Pl. LXV. f. 12); the olive-green discal area is triangular, narrowing to a point behind close to hinder angle of wing; its inner edge very oblique, crossing M at or near base of M^1; the outer edge of the area is quite straight from R^2 to M^2, nearly at right angles to the veins, while it slants distad from R^2 to SC^5, being somewhat curved between the veins; the marginal area is densely shaded with pinkish grey, except at edge of wing. The distal margin of the hindwing is blackish, with a reddish tint coming through.

Hab. West and East Africa.

In the Tring Museum 5 ♂♂, 5 ♀♀ from: Gold Coast; Congo; Loanda, v. (Mocquerys); Natal; Kikuyu Escarpment, Brit. E. Afr. Feb. 1901 (Doherty).

A long series from Ambriz, Congo, in the Dublin Museum.

477. Nephele comma.

**Zonilia viridescens* Walker, *List Lep. Ins. B. M.* viii. p. 192. n. 1 (1856) (partim;—Mus. Brit.).
**Nephele comma* Hopffer, *Monatsber. Ak. Wiss. Berlin* p. 421 (1857) (Mus. Berlin); id., in Peters, *Reise Mozamb., Zool.* v. p. 424. t. 27. f. 12 (1862) (Mozambique; Guinea).

♂♀. Black side-patches of abdomen reduced in size, those on segments 2 and 3 not distinct, pale dorsal area of segment 4 as wide (transversely) as the black side-patch. Submarginal line of forewing very sharply marked, almost straight from R^2 backwards, the marginal area limited by this line shaded with grey, especially at the line. Combs of tarsi and spurs heavy. Stigma of forewing absent, or represented by a minute dot, or by a comma-shaped spot which is widest behind, being here dilated proximad and distad, or only distad (Pl. LXIV. f. 13. 14).

a'. N. comma f. derasa nov.

Zonilia viridescens var., Walker, *l.c.* (partim).
Zonilia penaeus, Boisduval (*non* Cramer, 1776), *Spec. Gén. Lép. Hét.* i. p. 140. n. 2 (1875) (partim; ♂, *non* ♀).
Nephele viridescens, Butler, *Trans. Zool. Soc. Lond.* ix. p. 623. n. 12 (1877) (Natal); Westw., in Oates, *Matabeleland* p. 355 (1881); Druce, in Moloney, *West Afr. Forestry* p. 493. n. 20 (1887); Kirby, *l.c.* p. 680. n. 14 (1892) (Africa).
Nephele hespera ?, Holland, *Trans. Amer. Ent. Soc.* xvi. p. 68. n. 31 (1889) (Benita).
Nephele funebris, Butler (*non* Fabricius, 1793), *l.c.* p. 624. n. 13 (1877) (Congo); Butl., *Proc. Zool. Soc. Lond.* p. 674. n. 158 (1893) (Zomba, Jan.): Kirby, *l.c.* p. 680. n. 15 (1892) (partim); Schaus & Clem., *Sierra Leone Lep.* p. 19 (1893).
Nephele charoba, Möschler, *Abh. Senk. Naturf. Ges.* xv. p. 71. n. 159 (1890) (Accra).
Nephele charoba Kirby, *Trans. Ent. Soc. Lond.* p. 239. 243 (1877) (Madag.; partim).
Nephele hespera, Saalmüller (*non* Fabricius, 1775), *Lep. Madag.* p. 133. n. 310. t. 3. f. 42 (1884) (syn. excl.).

♂♀. Forewing without white spot, or only with a minute dot.

Hab. Africa south of the Sahara; Madagascar.

We cannot find any constant difference between Malagassic specimens and Aethiopian ones.

b'. N. comma f. *comma*.

Zonilia viridescens Walker, *l.c.* (partim).
**Nephele comma* Hopffer, *l.c.*; Butl., *Trans. Zool. Soc. Lond.* ix. p. 623. n. 11 (1877) (Natal); Westw., in Oates, *Matabeleland* p. 355 (1881); Druce, in Moloney, *West Afr. Forestry* p. 493. n. 19 (1887); Kirby, *Cat. Lep. Het.* i. p. 680. n. 12 (1892) (Africa).
Zonilia comma, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 142. n. 4 (1875) (Natal); Dew., *Mitth. Münch. Ent. Ver.* iii. p. 25 (1879) (Quinchoxo).
Nephele comma ?, Holland, *Trans. Amer. Ent. Soc.* xvi. p. 68. n. 30 (1889) (Benita).

♂♀. Forewing with a white comma-shaped spot (Pl. LXIV. f. 13).

Hab. This and the previous form occur commonly in West and East Africa as far south as Natal (probably also in Cape Colony).

c'. N. comma f. loc. *charoba*.

Deilephila morpheus, Boisduval (*non* Cramer, 1777), *Faune Mad. Bourb.* p. 75 (1833) (Madag.).
Zonilia didyma, Guénee (*non* Fabricius, 1775), in Vins., *Voy. Madag.* p. 30 (1865) (= *morpheus*).
Zonilia morpheus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 139. n. 1 (1875) (partim; Madag.); Mab., *Ann. Soc. Ent. France* p. 296 (1879) (Madag.).

Nephele charoba Kirby, *l.c.* (partim) ; Mab., *Ann. Soc. Ent. France* p. 296 (1879) (Madag.) ; Waterh., *Aid Ident. Ins.* ii. t. 141. f. 3 (♂) (1884) ; Saalm., *Lep. Madag.* p. 133. n. 309 (1884) ; Kirby, *Cat. Lep. Het.* i. p. 679. n. 7 (1892).
Nephile (!) *charoba*, Butler, *Cist. Ent.* ii. p. 393 (1879) (Madag.).
Nephele morpheus, Saalmüller, *l.c.* p. 133. n. 310 (1884).

♂ ♀. Like *comma*, but the white spot anteriorly thinner and posteriorly rather more dilated distad (Pl. LXIV. f. 14).

The reddish tint of Kirby's type is due to discoloration ; Continental *comma* as well as other *Nephele* assume the same tint.

Hab. Madagascar.

In the Tring Museum :—

60 ♂♂, 40 ♀♀ of f. *derasa* from : Sierra Leone ; Ogrugu, Niger ; Benguella, i. (Penrice) ; Cape Colony ; Natal ; Nyassaland ; Kiloa ; Dar-es-Salaam ; Kikuyu Escarpment, Brit. E. Afr. (Doherty) ; Madagascar.

24 ♂♂, 14 ♀♀ of f. *comma* from : Sierra Leone : Gold Coast ; Ogrugu, Niger ; Benguella, i. (Penrice) ; Natal ; Zomba, Likoma, and Bandawe, Nyassaland ; Kikuyu Escarpment, Brit. E. Afr. (Doherty) ; Masindi, Uganda, i. (Ansorge).

1 ♂, 1 ♀ of f. loc. *charoba* from : Madagascar.

478. **Nephele funebris.**

Sphinx funebris Fabricius, *Ent. Syst.* iii. 1. p. 371. n. 47 (1893) (Guinea) ; Auriv., *Ent. Tidskr.* xviii. p. 152. n. 81 (1897).
**Zonilia viridescens* Walker, *List Lep. Ins. B. M.* viii. p. 192. n. 1 (1856) (partim ;—Mus. Brit.).
**Nephele infernalis* Kirby, *Trans. Ent. Soc. Lond.* p. 239. 244 (1877) (Ashanti ;—Mus. Dublin) ; Waterh., *Aid Ident. Ins.* ii. t. 141. f. 4 (1884) ; Kirby, *Cat. Lep. Het.* i. p. 680. n. 13 (1892) ; Auriv., *Ent. Tidskr.* xiii. p. 183. n. 234 (1892) (Kamerun).
Nephele peneus, Karsch, *Ent. Nachr.* xvii. p. 297. n. 15 (1891) (Cameroons).

No more appropriate name, we think, could be found for this insect than *infernalis*, considering the time we spent over it without coming to a very satisfactory result ; however, the name must sink as synonym of *funebris*. The type of *funebris* is in Copenhagen. Dr. Meinert has kindly sent us a photograph of it, which shows it to be the same as *infernalis*. The species occurs in West and East Africa in a form without conspicuous white stigma, and also in a form with white spots. On the Upper Congo another dichromatic insect is found which seems to intergraduate with ordinary *funebris*, though it has, in the spotted form, an entirely different stigma. We treat this Congo insect as a subspecies of *funebris* ; but we must express our doubt of the two being specifically the same.

♂ ♀. Black lateral patches of abdomen large, proximal ones rectangular, not narrowed above as in *bipartita* ; underside of palpus scaled white and brown, contrasting with the uniformly clayish buff breast and underside of abdomen. Combs well developed.——Forewing similar in shape to that of *comma* ; greenish above in fresh specimens ; a faint shadowy band from middle of costa to outer margin just before angle.

Hab. Aethiopian Region, exclusive of the Malagassic Subregion.

a. N. funebris funebris.

Sphinx funebris Fabricius, *l.c.*
**Zonilia virescens* Walker, *l.c.* (Natal).
**Nephele infernalis* Kirby, *l.c.*

♂ ♀. Forewing uniform in colour, lines thin, not prominent; stigma, if present, consisting of two spots—namely, dots 2, and 3 + 4, the latter forming a horizontal triangular spot which points distad (Pl. LXIV. f. 8).

a'. N. funebris funebris f. *funebris.*

Sphinx funebris Fabricius, *l.c.*
**Zonilia viridescens* Walker, *List Lep. Ins. B. M.* viii. p. 192. n. 1 (1856) (partim).
**Nephele infernalis* Kirby, *l.c.*

♂ ♀. Stigma represented by a minute dot, which is sometimes absent.

b'. N. funebris funebris f. *conimacula* nov.

♂ ♀. Forewing with two white spots (Pl. LXIV. f. 8).——Rare.

Hab. Both forms in West and East Africa.

In the Tring Museum :—

18 ♂♂, 22 ♀♀ of f. *funebris* from: Sierra Leone; Ogrugu, Niger; Mikindani, Germ. E. Afr.; Mpapwa; Mombasa.

2 ♂♂, 4 ♀♀ of f. *cominacula* from: Sierra Leone (*type*); Dar-es-Salaam.

b. N. funebris maculosa subsp. nov.

♂ ♀. Larger than the preceding.——Forewing variegated with tawny-olive patches between the lines, especially between the subbasal, second and third discal lines, and distally of the postdisco-submarginal one; the latter patches generally very conspicuous, sometimes, however, blackish, and then contrasting less with the ground-colour; stigma, if present, a rather large ovate spot, being the enlarged dot 3.

c'. N. funebris maculosa f. *maculosa.*

♂ ♀. Without white spot on forewing.

d'. N. funebris maculosa f. *ovifera* nov.

♂. Forewing with white ovate spot (Pl. LXIV. f. 9).

Hab. Congo.

In the Tring Museum :—

9 ♂♂, 2 ♀♀ of f. *maculosa* from Yakusu, Stanley Falls, May, July, August (Rev. K. Smith); Bopoto (Rev. K. Smith); Upp. Congo; *type:* Yakusu, May.

4 ♂♂ of f. *ovifera* from Yakusu, May, July (Rev. K. Smith); *type:* May.

479. Nephele bipartita.

**Nephele bipartita* Butler, *Ann. Mag. N. H.* (5). ii. p. 455 (1878) (Old Calabar;—Mus. Brit.): Kirby, *Cat. Lep. Het.* i. p. 679. n. 2 (1892); Schaus & Clem., *Sierra Leone Lep.* p. 19 (1893) (partim ?).

♂ ♀. Scaling of antenna buff distally, not grey; underside of palpus scaled white and black, strongly contrasting with the tawny-ochraceous underside of the body; black side-patches of abdomen narrowed at upper end, those on third segment more or less distinctly connected with one another at base.——Forewing, above, much variegated with tawny-olive; a blackish band from middle of costa to hinder angle, not very prominent, but quite distinct, the area between this band and outer margin dark brown, including tawny-olive spots, which are often enlarged and merged together at costal margin to a large patch, which extends

to apex of wing; median area proximally of oblique band tawny-olive, traversed by the posterior portions of the discal lines; antemedian pair of lines generally merged together to a blackish band, which is curved costad in front, constricted in cell; between it and base there are a thin line, a broad patch and a small basal spot, separated by tawny-olive scaling, but often merged together. Stigma represented by a minute dot (there occurs probably a form with distinct stigma, as in most species of *Nephele*).

Hab. West and East Africa.

In the Tring Museum 6 ♂♂, 3 ♀♀ from: Ogrugu, Niger; Yakusu, Congo, vii. 1900 (K. Smith); Bopoto, Congo (K. Smith); Delagoa Bay; Dar-es-Salaam.

480. Nephele discifera.

**Nephele peneus* (Cr.), forma *discifera* Karsch, *Ent. Nachr.* xvii. p. 298 (1891) (Cameroons;—Mus. Berlin).

Nephele peneus var. *a. Neph. p.*, forma *discifera*, Kirby, *Cat. Lep. Het.* i. p. 680. sub n. 11 (1892) (Cameroons).

**Nephele aurcomaculata* Rothschild, Nov. Zool. i. p. 88 (1894) (Upp. Congo;—Mus. Tring); id., *l.c.* ii. t. 9. f. 8 (♀) (1895).

♂♀. *Upperside* very uniform in colour. No distinct lines on forewing; a minute stigma; a rounded orange-tawny patch at hinder margin just before middle; distal marginal area grey, limited by the irregular line which runs from apex to hinder angle; this line very indistinct in this species.

Underside of body tawny olive (Ridgway, *Nomencl. Colours* t. 3. n. 17), palpus below with grey and olive scales, whitish at the sides.

Hab. West Africa: Cameroons; Congo.

In the Tring Museum 1 ♂, 1 ♀ from the Upper Congo, the ♂ caught at Yakusu, Stanley Falls, in July 1900 (Rev. Kenred Smith).

481. Nephele peneus.

Sphinx peneus Cramer, *Pap. Exot.* i. p. 139. t. 88. f. D (1776) (Sierra Leone); Goeze, *Ent. Beytr.* iii. 2. p. 220. n. 58 (1780).

Sphinx didyma Fabricius, *Spec. Ins.* ii. p. 148. n. 41 (1781) (partim); id., *Mant. Ins.* ii. p. 96. n. 45 (1787) (partim); Gmel., *Syst. Nat.* i. 5. p. 2381. n. 79 (1790) (partim); Fabr., *Ent. Syst.* iii. 1. p. 371. n. 48 (1793) (partim).

Sphinx peneus (!), Fabricius, *l.l.c.c.* (sub syn.).

Nephele didyma, Hübner, *Verz. bek. Schm.* p. 133. n. 1433 (1822) (partim).

♂♀. Black lateral patches of abdomen large, that of third segment as distinct as the patch of the fourth; palpus with a large second segment, underside scarcely paler than breast. Combs of spurs large.——Forewing less elongate than in the allied species, distal margin strongly convex; a blackish shadowy band from middle of costal margin to hinder angle, posteriorly a little more proximal than in *bipartita*; area outside this band traversed in middle by the third discal line, which is dentate and is followed by a fourth line, also dentate, corresponding to the postdiscosubmarginal line of other species, the halfmoons between these two lines brown or olive tawny, the one between SC^5 and R^1 large; three white dots (Pl. LXIV. f. 6, 7), namely 1 + 3, 2, and 4; often 1 + 3 + 4, and 2 separate; seldom 2 + 1 + 3 + 4; or 2 + 1 + 3, and 4 separate; 1 and 3 apparently never separate; sometimes all three spots obscured, having assumed the ground-colour of the wing, seldom all absent. Discal lines of underside of forewing curved twice, S-shaped.

a'. N. peneus f. *peneus*.

Sphinx peneus Cramer, *l.c.*

Zonilia peneus, Walker, *List Lep. Ins. B. M.* viii. p. 193. n. 2 (1856) (partim); Dew., *Mitth. Münch. Ent. Ver.* iii. p. 25 (1879) (Chinchoxo).

Nephele peneus, Hopffer, in Peters, *Reise Mozamb., Zool.* v. p. 422. t. 27. f. 11 (1862) (Inhambane); Butl., *Trans. Zool. Soc. Lond.* ix. p. 623. n. 10 (1877) (W. Afr.; Sierra Leone); Westw., in Oates, *Matabeleland* p. 355 (1881); Druce, in Moloney, *West African Forestry* p. 493. n. 18 (1887); Kirby, *Cat. Lep. Het.* i. p. 679. n. 11 (1892) (Africa).

Zonilia penaeus (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 140. n. 2 (1875) (partim; ♀, *non* ♂).

Nephele penaeus (!), Möschler, *Abh. Senk. Naturf. Ges.* xv. p. 71. n. 157 (1890) (Accra).

Nephele peneus ?, Holland, *Trans. Amer. Ent. Soc.* xvi. p. 67. n. 29 (1889) (Benita; Kangwé).

**Nephele pachyderma* Karsch, *Ent. Nachr.* xviii. p. 180. n. 62 (1892) (Baliburg;—Mus. Berlin); Kirby, Nov. Zool. i. p. 102 (1894).

(?) *Nephele bipartita*, Schaus & Clem., *Sierra Leone Lep.* p. 19 (1893).

♂♀. Forewing with white spots as described above.

b'. N. peneus f. *innotata* nov.

♂♀. White spots absent. This form is apparently rare, while the white-spotted one is common.

Hab. Aethiopian Region, exclusive of the Malagassic Subregion.

In the Tring Museum:—

38 ♂♂, 20 ♀♀ of f. *peneus* from: Sierra Leone; Gold Coast; Ogrugu, Niger; Congo; Delagoa Bay; Nyassaland; German and Brit. East Africa; Uganda.

4 ♂♂, 1 ♀ of f. *innotata* from: Sierra Leone (*typè*); Gold Coast.

482. Nephele accentifera.

Sphinx accentifera Beauvois, *Ins. Afr. Amér.* p. 264. t. 24. f. 1 (1805) (Afr.).

Sphinx (*Deilephila*) *tridyma* Hoeven, *Tijdschr. Naturl. Gesch.* vii. p. 278. n. 2. t. 5. f. 2. a, b. (1840) (Guinea).

Deilephila ranzani Bertoloni, *Mem. Ac. Bologna* ii. p. 183. n. 21. t. 9. f. 6 (1850) (Mozambique).

Zonilia peneus, Walker (*non* Cramer, 1776), *List Lep. Ins. B. M.* viii. p. 193. n. 2 (1856) (partim).

Zonilia tridyma, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 141. n. 3 (1875) (Guinea).

Nephele accentifera, Hopffer, in Peters, *Reise Mozamb., Zool.* v. p. 423 (1862) (= *tridyma* = *ranzani*); Butl., *Trans. Zool. Soc. Lond.* ix. p. 623. n. 8 (1877) (Sierra Leone); Holl., *Trans. Amer. Ent. Soc.* xvi. p. 67. n. 28 (1889) (Benita; Kangwé); Möschl., *Abh. Senk. Naturf. Ges.* xv. p. 71. n. 158 (1890) (Accra); Kirby, *Cat. Lep. Het.* i. p. 679. n. 6 (1892) (S. Africa); Auriv., *Ent. Tidskr.* xiii. p. 183. n. 233 (1892) (Cameroons; Gabun).

Nephele variegata Butler, *Proc. Zool. Soc. Lond.* p. 15. n. 31 (1875) (Congo; Africa); id., *Trans. Zool. Soc. Lond.* p. 623. n. 7. (1877) (Congo; Africa; Abyss.); Druce, in Moloney, *West Afr. Forestry* p. 493. n. 17 (1888); Kirby, *Cat. Lep. Het.* i. p. 679. n. 10 (1892) (Congo); Schaus & Clem., *Sierra Leone Lep.* p. 19 (1893).

Zonilia accentifera, Dew., *Mitth. Münch. Ent. Ver.* iii. p. 25 (1879) (Chinchoxo); Plötz, *Stett. Ent. Zeit.* xli. p. 76. n. 284 (1880) (Cameroons).

Nephele accentifera var. *variegata*, Karsch, *Ent. Nachr.* xvii. p. 297. n. 14 (1891) (Cameroons); id., *l.c.* xviii. p. 180. n. 61 (1892) (Baliburg).

♂♀. Combs of tarsi and spurs heavy.——Forewing more variegated than in the allied species: the antemedian and discal lines irregular, rather distinct, second and third discal dentate, interspace between them more or less grey, a band proximally of the pair of antemedian lines also grey or clayish, and a triangular costal patch in front of the white spots clayish: black line bordering marginal area very irregular, projecting proximad at R^2, with tawny-olive patches at its proximal side, especially between SC^5 and R^2; three white spots (Pl. LXIV. f. 10. 11): one in cell, rounded, nearer SC than M, two at cross-veins, one above the other, the

upper thin, the second the largest of the three, more or less widened behind and curved outward, sometimes joined to the upper spot, or to the inner, seldom to both. Underside of palpus little paler than breast. Tenth segment see Pl. XLIV. f. 29. 30 ; harpe Pl. IL. f. 36 ; penis-sheath Pl. LV. f. 35.

Hab. Continental Africa ; common.

In the Tring Museum 120-odd specimens from Sierra Leone to Natal, and eastwards to British East Africa ; 1 larva, 2 pupae from Durban (Leigh).

483. Nephele argentifera.

**Zonilia argentifera* Walker, *List Lep. Ins. B. M.* viii. p. 194. n. 4 (1856) (Natal ;—Mus. Oxford) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 146. n. 12 (1875).

Nephele argentifera, Butler, *Trans. Zool. Soc. Lond.* ix. p. 622. n. 6 (1856) ; Kirby, *Trans. Ent. Soc. Lond.* p. 239 (1877) (Natal) ; Westw., in Oates, *Matabeleland* p. 355 (1881) ; Kirby, *Cat. Lep. Het.* i. p. 679. n. 5 (1892) (Natal) ; Pagenst., *Jahrb. Hamb. Wiss. Anst.* x. 2. p. 38. n. 103 (1893) (Mozambique, 8. i. ; Quilimane, 8. iii.).

♂♀. A conspicuous insect, recognised at a glance by the two silvery, posteriorly converging bands of the forewing : the first subbasal, straight, at right angles to costal margin, the other discal, somewhat curved, widened behind and in front ; fringe of hinder margin white between the bands ; stigma large, oblique, subtriangular, upper distal edge longest ; the spot consists of the dots 1 and 2, the two being sometimes nearly separated ; spot 3 is generally present as a minute dot.

Hab. East Africa : from Natal to British East Africa.

In the Tring Museum 12 ♂♂, 12 ♀♀ from : Delagoa Bay ; Kiloa ; Lindi ; Dar-es-Salaam ; Mombasa.

484. Nephele densoi.

Zonilia densoi Keferstein, *Jahrb. Ak. Erfurt* (2). vi. p. 14. t. 2. f. 5 (1870) (Madag.) ; Mab., *Ann. Soc. Ent. France* p. 296 (1879) (Madag. ; = *malgassica* = *rhadama*).

**Zonilia malgassica* Felder, *Reise Novara, Lep.* t. 76. f. 2 (1874) (Madag. ;—Mus. Tring) ; Boisd., *l.c.* p. 147. n. 14 (1875) (Nossi-bé).

**Zonilia rhadama* Walker, *List Lep. Ins. B. M.* viii. p. 33 (1864) (Madag. ; *nom. nud.*) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 146. n. 13 (1875) (Madag. ;—coll. Charles Oberthür).

Nephele densoi, Butler, *Trans. Zool. Soc. Lond.* ix. p. 622. n. 3 (1877) ; Saalm., *Lep. Madag.* p. 135. n. 311. t. 4. f. 43. 43a (1884) (= *malgassica* = *rhadama*) ; Kirby, *Cat. Lep. Het.* i. p. 679. n. 8 (1892) (Madag.).

Nephele malgassica, Butler, *Trans. Zool. Soc. Lond.* ix. p. 623. n. 9 (1877) (= *densoi* ?) ; Kirby, *l.c.* n. 9 (1892) (Madag.).

Nephele rhadama, Butler, *l.c.* p. 630 (1877).

♂♀. Stands midway between *oenopion* and *accentifera*. Discal lines of forewing, *above*, straight, slightly curved, not dentate, interspaces forming a pale inconspicuous band, similar to that of *oenopion*, but as much proximal as in *rosae*, not edged with white ; stigma (Pl. LXIV. f. 4. 5) : dot 1 rounded, 2 forming a right angle, the outer arm of it extending along R^3, often interrupted, spot 3 minute.

Hab. Madagascar.

In the Tring Museum 10 ♂♂, 11 ♀♀ from : Madagascar, one of them from Antanambé, Baie d'Antongil, iii. iv. 1897 (A. Mocquerys).

A pair from Grande Comore in the Tring Museum represents perhaps a subspecies confined to the Comoro Islands ; the two specimens, one of which is in fairly good condition, are darker than our Madagascar individuals, and have the pale discal band of the forewing more curved in front.

485. Nephele oenopion.

Orneus oenopion Hübner, *Samml. Ex. Schm.* ii. t. 159 (1806—?).
Zonilia oenopion, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 149. n. 18 (1875) (Mad.; Maurit.; Bourb.: "Natal" alia spec.?).

♂♀. Forewing with two bands; one subbasal, edged with white proximally and distally, the other discal, 6 or more mm. from lower angle of cell at R^3, straight, or slightly concave proximally, widest in front, its inner edge white, outer edge also white, or pale cinnamon: fringe of hinder margin white between the bands. No stigma, or only a small white spot.

Palpus concolorous with under surface of body, first segment with a small pale lateral spot.

Hab. Aethiopian Region.

Three subspecies:

a. N. oenopion oenopion.

Orneus oenopion Hübner, *l.c.*
Deilephila oenopion, Boisduval, *Faune Mad. Bourb.* p. 75. n. 8 (1833) (Bourbon: Mauritius).
Philampelus oenopion, Walker, *List Lep. Ins. B. M.* viii. p. 182. n. 14 (1856).
Zonilia oenopion, id., *l.c.* xxxi. p. 33 (1864) (Bourbon; Madagascar); Mab., *Ann. Soc. Ent. France* p. 296 (1879) (Madag.); Vins., *Pap. Bourbon* p. 13 (1891).
Nephele oenopion (!), Butler, *Trans. Zool. Soc. Lond.* ix. p. 622. n. 2 (1877) (Bourb.; Madag.).
Nephele oenopion, Kirby, *Trans. Ent. Soc. Lond.* p. 239 (1877) (Madagascar); Saalm., *Lep. Madag.* p. 133. n. 308 (1884) (Nossi-bé); Kirby, *Cat. Lep. Het.* i. p. 679. n. 3 (1892) (Madag.; Bourbon).

♂♀. Discal band of forewing broad, the dark line within it thin, dividing the band into a broad proximal and a thin outer portion, the latter only a third the width of the former at R^3 and not white, as is the proximal edge of the band.

Hab. Bourbon; Mauritius; Madagascar.

In the Tring Museum 2 ♂♂, 1 ♀ from Bourbon.

b. N. oenopion stictica subsp. nov.

♂. Like the preceding, but forewing with a small but distinct rounded white stigma.

Hab. Grande Comore.

In the Tring Museum 1 ♂ from Grande Comore (*type*).

c. N. oenopion continentis subsp. nov.

Zonilia oenopion, Boisduval, in Deleg., *Voy. Afr. Austr.* p. 595. n. 111 (1847) (Natal; *nom. indescr.*; *haec spec.?* an *rosae*?); Mab., *Bull. Soc. Ent. France* p. 221 (1890) (Congo).
Nephele oenopion, Schaus & Clem., *Sierra Leone Lep.* p. 19 (1893).

♂♀. Somewhat smaller than the preceding; discal band of forewing narrower, the dark line within it broader, dividing the band into two lines, of which the external one is not much thinner than the inner one, and is also more or less white. Few specimens have a minute white stigma on the forewing.

Hab. West Africa, apparently not rare. We have not seen specimens from the eastern side of the Continent, where the species occurs without doubt.

In the Tring Museum 19 ♂♂, 13 ♀♀ from: Sierra Leone, *type*, June 1896 (Capt. Stevens); Agberi, Niger, 9. xi. 1901 (Dr. Ansorge).

486. Nephele rosae.

**Nephele rosae* Butler, *Proc. Zool. Soc. Lond.* p. 14. n. 30 (1875) (Boma ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 622. n. 4. t. 94. f. 3 (1877) ; Dew., *Mitth. Münch. Ent. Ver.* iii. p. 25 (1879) (Chinchoxo) ; Druce, in Moloney, *West Afr. Forestry* p. 493. n. 16 (1887) ; Kirby, *Cat. Lep. Het.* i. p. 679. n. 4 (1892) (Boma).

♂ ♀. Similar to *oenopion*. Pale discal band of forewing broad, its white proximal border-line only 4 mm. from lower angle of cell at R^3 ; the subbasal band not edged with white, nor is the fringe of the hinder margin white between subbasal and discal bands ; a thin, longitudinal, comma-shaped stigma, which is sometimes reduced to a dot, seldom absent (from our only East African individual). Underside of body paler than in *oenopion* ; first segment of palpus with white scales.

Hab. Africa ; apparently rarer in the east than in the west of the Continent.

No representative known from Madagascar and neighbouring islands.

In the Tring Museum 16 ♂♂, 9 ♀♀ from : Sierra Leone ; Old Calabar : Bopoto and Yakusu, Congo, vii. (K. Smith) ; Nguelo, Germ. E. Africa.

487. Nephele rectangulata.

**Nephele rectangulata* Rothschild, *Iris* vii. p. 300. n. 12 (1894) (Sierra Leone ;—coll. Staudinger) ; id., Nov. Zool. ii. t. 9. f. 7 (♂) (1895).

♂ ♀. Comb of short terminal spur of hindtibia not heavy. The species is easily recognised by the angle of about 90° formed at hinder angle of forewing by two white lines, one submarginal, slightly curved, ending at tip of wing, the other running straight across the wing to costal margin, entering the cell at lower angle. The hindwing and under surface are brighter tawny in our fresh ♀ than in the ♂ figured ; the submarginal line is too obviously dentate in the figure.

Hab. Sierra Leone.

In the Tring Museum 1 ♂, 1 ♀ from Sierra Leone.

488. Nephele aequivalens.

**Pachylia aequivalens* Walker, *List Lep. Ins. B. M.* viii. p. 191. n. 5 (1856) (Sierra Leone ;—Mus. Brit.).

**Zonilia zeba* Boisduval, *l.c.* p. 148. n. 16 (1875) (= *aequivalens* ? : Sierra Leone :—Mus. Brit.).

Nephele aequivalens, Butler, *Trans. Zool. Soc. Lond.* ix. p. 622. n. 1 (1877) (Sierra Leone) ; Druce, in Moloney, *West Afr. Forestry* p. 493. n. 15 (1887) ; Möschl., *Abh. Senk. Naturf. Ges.* xv. p. 71. n. 161 (1890) (Accra) ; Kirby, *Cat. Lep. Het.* i. p. 679. n. 1 (1892) (Sierra Leone) ; Schaus & Clem., *Sierra Leone Lep.* p. 19 (1893).

♂ ♀. The largest species of the genus. Combs of spurs and of tarsi strongly developed. Hindtarsus exactly twice the length of the tibia, first segment as long as the four others together. Abdomen without distinct black side-patches. Forewing with a black band from costal margin near end of cell to end of M^2 ; postdisco-submarginal line almost evenly curved from tip of wing to tip of M^2 ; one discal line, beginning at costal margin midway between oblique band and apex of wing.

♂. Tenth sternite rather shorter than in the other species, and the harpe more abruptly hooked.

Hab. Continental Tropical Africa : Sierra Leone to the Congo and East Africa.

In the Tring Museum 7 ♂♂, 5 ♀♀ from : Sierra Leone ; Gold Coast ; Ogugu, Niger ; Dar-es-Salaam.

CXXXI. TEMNORA.—Typus : *natalis*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* iii. p. 23 (1779).
Engo Hübner, *Verz. bek. Schm.* p. 132 (1822) (partim : type : *japix*) ; Walk., *List Lep. Ins. B. M.* viii. p. 112 (1856) (partim).
Temnora id., *l.c.* p. 114 (1856) (type : *natalis*) ; Kirby, *Cat. Lep. Het.* i. p. 640 (1892).
Panacra id., *l.c.* p. 151 (1856) (partim ; type : *automedon*).
Diodosida id., *l.c.* p. 163 (1856) (type : *murina*) : Kirby, *l.c.* p. 642 (1892).
Darapsa id., *l.c.* p. 182 (1856) (partim ; type : *choerilus=choerilus=pholus*)
Zonilia id., *l.c.* p. 192 (1856) (partim ; type : *viridescens=Nephele funebris*).
Lophuron Boisduval, in Deleg., *Voy. Afr. Austr.* p. 594 (1847) (*nom. indescr.*) ; Wallengr., *K. Vet. Ak. Hand.* (2). v. 4. p. 17 (1865) (type : *pylas?*) ; Kirby, *l.c.* p. 641 (1892).
Lophura Herrich-Schäffer (*non* Flemming, 1822), *Auss. Schmett.* p. 59 (1858) (*nom. indescr.*).
Oeyton Boisduval, *Spec. Gén. Lép. Hét.* i. p. 303 (1875) (type : *murina=tyrrhus*).
Aspledon id., *l.c.* p. 305 (1875) (type : *zantus = doras*).
Choerocampa, Mabille, *Ann. Soc. Ent. France* p. 299 (1879).
Gurelca Kirby, *Proc. Roy. Dublin Soc.* (2). ii. p. 330 (1880) (partim ; *nom. indescr.*, loco *Lophura*).
Eulophura Holland, *Trans. Amer. Ent. Soc.* xvi. p. 58 (1889) (type : *atrofasciata*).
Choerocampa, id., *l.c.* p. 63 (1889).
Pseudengyo, Karsch (*non* Holland, 1889), *Ent. Nachr.* xvii. p. 291 (1891) ; Kirby, *l.c.* p. 644 (1892) (partim).
Metapsilus, Kirby (*non* Duncan, 1836), *l.c.* p. 660 (1892) (partim).
Pterogon, Rothschild (*non* Boisduval, 1836), *Nov. Zool.* i. p. 69 (1894).

♂♀. Genal process obtusely triangular, not reaching end of pilifer. Palpi with some hair-scales laterally, more or less triangular together in dorsal aspect. Head with mesial crest, which is mostly rather prominent. Eye lashed. Antenna slightly incrassate distally in ♂, distinctly clubbed in ♀, end-segment *long*, rough-scaled. Abdomen with elongate spines, which are never very strong ; anal tuft of ♂ truncate, of ♀ very thin. Tibiae *not* armed ; spurs not spinose, two pairs to hindtibia ; midtarsus with comb ; paronychium with two pairs of lobes ; merum of midcoxa angulate and somewhat carinate at hinder edge, or simple. R^2 of hindwing in or before centre of cell, R^3 and M^1 rather close together, cross-veins oblique, lower angle of cell acute ; distal margin of wings often dentate, of forewing always sinuate below apex.

♂. Tenth tergite elongate-triangular ; sternite generally elongate, sometimes truncate or even sinuate, but not divided into long lobes. Clasper sole-shaped, always with 4 or 5 large friction-scales, situated at the lower edge of a more or less conspicuous groove, which they cover ; harpe ending generally in a simple process, sometimes curved and pointed as in *Nephele*, or spatulate, often broad and short. Penis sheath with stiff hairs inside ; the external armature consists of one or two series of teeth, or a dentate lobe, or a more or less elevate elongate patch of teeth, etc., as illustrated by Pl. LV. f. 45—55 and Pl. LVI. f. 1—13.

Larva. We have all stages of *marginata*, received from Mr. Leigh, Durban.

First stage (one specimen) : green, reddish on back : head large ; horn black, very long, densely hairy (tip not preserved), almost straight ; five bristles : two dorso-lateral, one above stigma, and two below.

Second stage (two specimens) : covered with pale dots, each bearing a very short hair ; a yellow dorso-lateral shade from horn forward ; horn long, red, tip pale, sinuate.

Third stage (one specimen) : yellow, reddish at sides ; slightly tapering in front, but the granulose head rather large ; pale dots present, hairs vestigial ; horn red at base, tubercles black, tip narrowed to an almost smooth point ; a yellow dorso-lateral line from mesonotum to horn, annulets obviously raised within this line.

Fourth (last) stage (one specimen) : like the previous, but tapering in front, horn comparatively shorter.

Pupa (of *marginata*) pale clay colour, punctures and grooves brown, labrum black, dorsal line brown ; tongue-case not carinate, very little projecting frontad ; labrum terminal ; head rounded ; anterior femur not visible ; abdomen punctured, praespiracular area of fourth and fifth segments not carinate, but the anterior edges of the punctures here more raised ; anal segments deeply impressed ventrally ; cremaster somewhat flattened, dispersedly punctured at base, smooth, conical in dorsal view (tip broken ; Pl. LXIV. f. 23).

Hab. Aethiopian Region inclusive of Madagascar.

Thirty-one species ; many more will be discovered when the heterocerous Lepidoptera of Africa become better known.

Allied to *Nephele*, from which it is easily distinguished by the spurs being without comb of spines.

The species with entire wings and those with dentate or lobate distal margin are connected by intergradations ; the same applies to the forms with acute and with obtuse or truncate apex of forewing.

From this genus several others have originated by the loss or reduction of organs and the acquisition of new structures. The reduction of the antennal end-segment and the loss of the ♂ friction-scales characterises *Temnoripais* ; *Odontosida* agrees with this, but is further advanced in having lost the ventral lobes of the paronychium and the patch of sensory hairs at the base of the palpus, and acquired the terminal claw to the foretibia ; *Sphingonaepiopsis* is still more specialised in the fan-like scaling of the first palpal segment, the more strongly clubbed antenna, which is dentate or pectinate in ♂, and the acquisition of spines to the tibiae ; and *Microsphinx* represents the end of this series, having the distal segments of the antenna unusually broad and short, and being without the proximal pair of hindtibial spurs (the only instance among the *Sphingidae semanophorae* where these spurs are absent). From *Temnora pylas* and allies (respectively their ancestor) branched off *Gurelca* in which the distortion of the costal margin of the hindwing, indicated in *Temnora pseudopylas*, is carried out in a similar way as in the Ambulicine genus *Degmaptera*, and in which the antennal end-segment has become short and the tibiae acquired spines. These lines of development are quite similar to those found in the subfamily *Ambulicinae*, resulting in weak forms. Entirely different is the line *Temnora*—*Atemnora*—*Macroglossum*. Here we observe the same kind of specialisation which we found in the higher American *Sesiinae*, beginning with forms characterised by slender antenna, weak abdominal spines, rounded midcoxal merum, truncate tail, etc., and ending with forms with strongly clubbed antenna, strongly angulate mid- and hindcoxal merum, strongly spined abdomen, compressed hindtarsus with densely spinose outer surface, large fantail, etc. A side-branch of this line is *Antinephele*—*Hypaedalia* (compare diagram, facing p. 499), the latter genus showing in one species a yellow abdominal side-patch homologous to the side-patches observed in most *Macroglossum*,

Key to the species :

a. Hindwing red or brown		*b.*
Hindwing yellow.		*w.*
b. Abdomen with glossy golden spots	491.	*T. aureata*
Abdomen without glossy golden spots, forewing with conspicuous buffish white lines	492.	*T. radiata.*
Abdomen without glossy golden spots, forewing without conspicuous buffish white lines		*c.*
c. Forewing olive-brown, with transverse discal band	502.	*T. famosa.*
Forewing grey, with transverse discal band or trace of it, distal margin not dentate		*d.*
Forewing grey or brown, with large costal discal patch or oblique band		*f.*
d. Hindwing with brown border	494.	*T. murina.*
Hindwing more or less uniformly brown		*e.*
e. Abdomen with white lateral dots below	495.	*T. grandidieri.*
No such dots ; fringe of forewing sharply marked white and brown	490.	*T. griseata.*
A larger species : fringe almost unicolorous, at least on underside	489.	*T. lirida.*
f. Forewing with costal discal patch, sharply limited by R^3		*g.*
Forewing with similar patch which is interrupted by grey lines	507.	*T. natalis.**
Forewing with oblique band		*h.*
g. Apex of forewing acuminate	504.	*T. plagiata.*
Apex of forewing truncate-sinuate	508.	*T. spiritus.*
h. Band of forewing very broad, well defined proximally and distally, not including grey lines, distal margin of forewing not dentate	505.	*T. atrofasciata.*
Band of forewing not so		*i.*
i. Oblique band of forewing sharply limited on distal side by a pale line		*j.*
Oblique band of forewing gradually fading away distally		*l.*
j. First segment of palpus with conspicuous white line	510.	*T. palpalis.*
First segment of palpus without white line		*k.*
k. Forewing dentate, apex acuminate	511.	*T. crenulata.*
Forewing entire, apex acuminate	493.	*T. inornatum.*
Forewing dentate, apex truncate-sinuate	506.	*T. zantus.*
l. Hindwing bright orange-rufous, both wings denticulate	509.	*T. elegans.*
Hindwing brown ; if ferruginous, wings not dentate		*m.*

* A similar species described in the Appendix.

m. Forewing, above, with a brown subapical costal patch, often developed to a band, separate from the oblique band		*n.*
Forewing without that patch		*q.*
n. Forewing above and below with a creamy dash before M^2 near hinder angle		*o.*
Forewing above and below without that dash		*p.*
o. Forewing above with a pale round dot on disc before R^3	513.	*T. scitula.*
Forewing above without this pale round dot	514.	*T. eranga.*
p. Oblique band of forewing narrow, sharply defined proximally, being limited by a straight pale line	512.	*T. reutlingeri.*
Band very broad, but proximally sharply defined	498.	*T. subapicalis*
Band broad, but proximally not sharply defined	515.	*T. iapygoides.*
q. Forewing angulate at R^2; underside olivaceous	503.	*T. sardanus.*
Forewing rounded in middle ; underside more or less cinnamon-rufous		*r.*
r. First segment of palpus with conspicuous white scales, external surface of hindtibia also white at end	500.	*T. argyropeza.*
This white scaling absent		*s.*
s. Basi-discal area of forewing below brighter ferruginous than disc	496.	*T. namaqua.*
Basi-discal area of forewing darker brown than disc		*t.*
t. Fringe of forewing, above, white between M^1 and SM^2	497.	*T. sterensi.*
Fringe of forewing, above, not white between M^1 and SM^2		*v.*
v. Marginal space of underside between submarginal line and fringe of the same colour as disc, at least in middle	499.	*T. marginata.*
This space filled in with cinnamon-brown	501.	*T. funebris.*
w. Antemedian double line of forewing, above, conspicuous, filled in with brown	516.	*T. pylas.*
Antemedian double line of forewing thin, not filled in with brown		*x.*
x. Costal margin of hindwing with a distinct subbasal lobe		*y.*
Costal margin of hindwing with the subbasal lobe vestigial	517.	*T. pylades.*
y. Marginal band of hindwing bordered broadly with ferruginous	518.	*T. pseudopylas.*
Marginal band of hindwing all brown	519.	*T. leptis.*

489. Temnora livida.

**Chaerocampa livida* Holland, *Trans. Amer. Ent. Soc.* xvi. p. 63, n. 19, t. 3, f. 4 (♀) (1889) (Benita;—coll. Holland).

Metopsilus lividus. Kirby, *Cat. Lep. Het.* i. p. 660, n. 8 (1892) ("Cameroons" ex errore).

♂ ♀. The largest species of the genus. Palpi obtusely triangular. Eye-lashes short. Midcoxal merum with the carina and angle vestigial. Long terminal spur of hindtibia more than double the short one, and half the length of the first tarsal segment, which equals 2 to 4; external row of spines of foretarsus simple. Spines of abdomen weak. Crest of head as in *fumosa*, not prominent. Body and upperside of forewing smoky grey, upperside of hindwing and basal half of underside of forewing blackish olive brown; rest of underside of wings russet-drab.——Forewing, above, with a faint large median costal patch, a smaller one half-way to apex, continued backwards by a series of vein-dots, and a third at hinder margin before angle, blackish brown; fringe pale between veins above, unicolorous below: apex acuminate, distal margin entire, rounded from SC^5 to M^2. ——Fringe of hindwing creamy buff, except at veins.

♂. Tenth tergite narrow, truncate, strongly curved (Pl. XLIV. f. 51, lateral view; f. 50, ventral view); sternite short, broad, truncate, incised, resembling the sternite of *atrofasciata* and *marginata*. Clasper with large groove as in *fumosa*, covered by large friction-scales; harpe of the type of *Nephele*, and of *fumosa* and *palpalis*, being produced into a slender curved process (Pl. IL. f. 35). Penis-sheath (Pl. LV. f. 45) with the left apical ventral edge raised to a curved dentate ridge.

Hab. West Africa: Niger to Ogowé.

In the Tring Museum 1 ♀ from the Niger, Akassa to Onitsha (Dr. Cook).

490. Temnora griseata spec. nov. (Pl. VII. f. 9, ♀).

♀. Palpi obtuse. Eye-lashes not dense. Midcoxal merum not angulate; external row of spines of foretarsus doubled or trebled from base to apex; first segment of midtarsus nearly as long as segments 2 to 5; long terminal spur of hindtibia half the length of the first tarsal segment (hindtarsus not complete). Abdominal spines weak.

Upperside of body and forewing grey, almost fawn-colour, *underside* of body paler, slightly pinkish.——Forewing shaped as in *livida*, but hinder margin less sinuate; indistinctly variegated with brown, a subapical costal brown patch is the only distinct marking, it is continued backwards by a series of indistinct brown vein-dots; fringe cream-colour, sharply spotted with brown at the veins.—— Hindwing blackish olive-brown; fringe cream-colour, with minute brown dots.

Underside of both wings pinkish buff, but forewing shaded over for the greater part with blackish olive-brown; fringe spotted brown and cream-colour.—— Forewing: a broad brown marginal band, shaded with grey, widest at R^2, including a broken oblique line between SC^4 and SC^5; at the costal margin traces of four zigzag lines are visible, the third continued backwards by vein-dots.——Hindwing uniform in colour, except at outer margin, where there is a trace of a brown band; one interrupted line, postdiscal, accentuated upon veins.

Length of forewing: ♀, 27 mm.

Hab. Tvoko, Congo (Morcels), 1 ♀ in Musée d'Hist. Nat., Bruxelles.

Very close to *lirida*, distinguished by the sharply spotted fringe and more variegated colour of the forewing, the almost salmon buff under surface, and the more distinct and irregular marginal band of the forewing below.

491. Temnora aureata (Pl. VII. f. 7. ♀, cotype).

**Oeyton aureata* Karsch, *Ent. Nachr.* xvii. p. 293. n. 3 (1891) (Barombi, Cameroons ;—Mus. Berlin).
Diadosida aureata, Kirby, *Cat. Lep. Het.* i. p. 642. n. 7 (1892).
**Lophuron brevipenne* Rothschild, *Iris* vii. p. 296. n. 2. t. 5. f. 5 (1894) (Cameroons :—coll. Staudinger).

♂ ♀. A short-winged species, differing from all other *Temnora* in the glossy golden spots of the abdomen. Eye-lashes rather dense. Spurs of midtibia little longer than fourth tarsal segment ; first midtarsal segment as long as 2 to 4 together. Merum of midcoxa not angulate.——Forewing, above, with a band of three almost straight parallel lines ; submarginal line beginning at apex of wing, evenly curved to R^3, then irregular ; fringe brown, with two pale spots behind.——Fringe of hindwing brown at, and vinaceous between, veins, white between M^1 and SM^2.

Underside with a sharply defined brown marginal band to both wings ; forewing brown from base to third discal line, except costal margin, then ferruginous, speckled with tawny ; hindwing pale ferruginous, speckled with tawny, two evenly curved discal lines.

♂. Tenth tergite truncate-sinuate ; sternite broad, rounded-triangular (Pl. XLIV. f. 49). Harpe resembling that of *murina*, apex more pointed. Penis-sheath (Pl. LVI. f. 8) with a row of teeth at the dorsal side and an apical process at the right ventral side.

Hab. Cameroons ; Zanzibar.

Several specimens in the Berlin Museum, of which a ♀ has been given in exchange to the Tring Museum ; also in coll. Staudinger.

A ♀ from Zanzibar (Fischer) in the Berlin Museum differs in being deeper brown (less reddish) above and below.

492. Temnora radiata.

**Oeyton radiata* Karsch, *Ent. Nachr.* xviii. p. 116. n. 3 (1893) (Bismarckburg, Togoland, January :—Mus. Berlin).
Diadosida radiata, Kirby, Nov. Zool. i. p. 100. n. 14 (1894).

♂. Easily recognised by the peculiar buffish white markings of the forewing, namely : a longitudinal line from base to disc, crossed by two subbasal lines, which are obsolete in front ; from lower angle of cell two dentate lines to hinder margin and a straight one to hinder angle ; on disc three dentate lines between costal margin and longitudinal line, and an oblique subapical costal line.

Hab. Togoland.

One ♂ in the Berlin Museum : not seen in other collections.

493. Temnora inornatum.

**Lophuron inornatum* Rothschild, Nov. Zool. i. p. 71. t. 5. f. 8 (♂) (1894) (Namaqualand ; Mus. Tring).

♂ ♀. Palpi obtuse, not much projecting. Eye-lashes long, but not very dense. Hinder margin of midcoxal merum rounded, not carinate. Longer terminal spur of hindtibia more than half the length of first tarsal segment,

Similar to *murina* in colour, and to *namaqua* in shape, but easily distinguished by the following characters: interspace between first and second discal line of forewing filled in with brown at costal and at hinder margin, this costal patch continued distad behind R^3 to near outer margin, and the space between R^3 and hind-margin also more or less shaded with brown and showing three dentate lines; posterior portion of interspace between the pair of antemedian lines also filled in with brown; distal margin bisinuate as in *namaqua*.—— Hindwing with traces of ferruginous lines, the second and third brown behind. Second and third discal line of underside dentate, if distinctly marked.

♂. Abdominal scent-tuft creamy buff. Tenth segment as in *plagiata*; tergite slender, apex rounded; sternite of nearly the same length, broader, widest at end, which is rounded. Harpe with broad, flat process, which is sinuate ventrally, the portion distal of the sinus ovate (Pl. L. f. 5). Penis-sheath (Pl. LV. f. 52) with a dentate ridge similar to that of *plagiata*, *palpalis*, etc.

Hab. South Africa.

In the Tring Museum 1 ♂, 2 ♀♀ from: Little Namaqualand, Cape Colony; Natal (Spiller).

494. **Temnora murina** (Pl. VII. f. 1, ♂).

Lophuron tyrrhus Boisduval, in Deleg., *Voy. Afr. Austr.* p. 594 (1847) (Zululand) (*nom. nud.*; haec spec. teste Boisd. 1875).

**Diodosida murina* Walker, *List Lep. Ins. B. M.* viii. p. 163. n. 1 (1856) (Natal;—Mus. Brit.): Wallengr., *Kongl. Sv. Vet. Ak. Handl.* v. 4 p. 18 (1865) (Caffr.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 553. n. 1 (1877) (Natal); Kirby, *Cat. Lep. Het.* i. p. 642. n. 1 (1892).

**Ocyton tyrrhus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 303. n. 1 (1875) (Natal: Caffraria:—coll. Charles Oberthür).

Ocyton murina, id., *l.c.* p. 304. n. 2 (1875) (Natal).

Diodosida tyrrhus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 632 (1877) (= *murina*).

♂♀. Palpi obtuse; eye-lashes not dense; first segment of foretarsus equalling 2 to 4 in length, or longer, outer row of spines doubled at base; hinder edge of mesum of midcoxa rounded, carina vestigial. Upperside of tibiae whitish grey. First and second discal line rather more distinct than usually in this genus, the interspace anteriorly filled in with brown. Underside of body and wings almost uniformly vinaceous cinnamon (Ridgway, *Nomencl. Colours* t. 4. no. 15), discal lines brown, marginal band brownish, not distinct.

♂. Tenth tergite and sternite of nearly equal length, both slender, rounded at tip. Clasper with five friction-scales; harpe (Pl. L. f. 20) slender, apex curved upwards, somewhat spatulate in dorsal aspect. Penis-sheath (Pl. LV. f. 47) with a free process at the right side, dentate, continuous with a dentate ridge situated at the left side.

Hab. South Africa.

In the Tring Museum 6 ♂♂, 2 ♀♀ from Natal.

495. **Temnora grandidieri** (Pl. VII. f. 8, ♂).

**Diodosida grandidieri* Butler, *Ann. Mag. N. H.* (5). iv. p. 234 (1879) (Madag.:—Mus. Brit.): Saalm., *Lep. Madag.* p. 121. n. 279 (1884); Kirby, *Cat. Lep. Het.* i. p. 642. n. 10 (1892).

♂. Closely allied to *murina*; underside much more grey; abdomen below with two rows of minute white dots. Hinder angle of forewing more produced, a brownish basal posterior patch, fringe with two white spots behind.—— Hindwing

almost as in *marginata*, olive-brown, the tawny ground-colour appearing on disc ; no sharply defined marginal band ; anal angle grey ; fringe almost pure white.—— Forewing *below* olive-brown from base to disc, distal margin also brown, disc more or less tawny ; postdiscal dots conspicuous on both wings.

Sexual armature as in *murina*, but the tenth segment slenderer, the sternite more acuminate and curved upwards at end, and the free process of the penis-sheath acute, not dentate.

Hab. Madagascar.

Three ♂♂ in the British Museum.

Two ♂♂ in coll. Charles Oberthür from Betsileo (Cowan), one of them here figured.

496. **Temnora namaqua** spec. nov. (Pl. VII. f. 2, ♂).

♂♀. Intermediate between *murina* and *marginata*. Ground-colour of body and forewing above nearly as in *murina*. Upperside of tibia not greyish white. ——Forewing, *above*, with an oblique discal band from costal to outer margin, rather well defined proximally and concave, gradually fading away distally ; distal margin bisinuate, convex in middle, apex produced, hinder angle more produced backwards than in *murina*.—— Hindwing reddish ferruginous, purer in colour than in *murina*, brown marginal band well defined, not much narrowed behind ; fringe buffish white, darker at end of veins.

Underside as in *murina*, but basi-discal area of forewing cinnamon-rufous, brighter than the rest of the wing.

♂. Tenth tergite (Pl. XLIV. f. 47) slender, truncate ; sternite very much shorter than the tergite, rounded-truncate. Harpe (Pl. L. f. 18) much broader than in *murina* and narrower than in *marginata*, compressed, irregular, apex somewhat curved downwards. Penis-sheath (Pl. LVI. f. 5) similar to that of *plagiata*, bearing a dentate ridge.

Hab. South-West Africa ; probably more widely distributed over South and East Africa.

In the Tring Museum 1 ♂, 5 ♀♀ from Little Namaqualand, Cape Colony ; *type* : ♂.

497. **Temnora stevensi** spec. nov. (Pl. VII. f. 15, ♂).

♂. Intermediate in the shape of the forewing between *marginata* and *funebris* ; differing from both as follows : the brown oblique discal band of the forewing, *above*, restricted in breadth and length, ill-defined both proximally and distally, not extended to outer margin, not broader in front than at M^1 ; brown marginal area SC^4—R^3 tapering in front and behind, irregular, being incised at the veins ; grey scaling at this short band more distinct than in the allied species ; fringe *white* between R^3 and SM^2 on the upperside. *Underside* as in *marginata*, the lines less distinct.

Sexual armature quite distinct. Abdominal scent-tuft pale vinaceous buff. Tenth tergite as broad as in *funebris*, but much shorter ; sternite gradually merging into the anal cone, *without* free process (Pl. XLIV. f. 44). Friction-scales and groove as in *funebris* ; harpe short (Pl. L. f. 1), broad, curved upwards. Penis-sheath (Pl. LV. f. 49) with a very short, dentate, double ridge some distance before end.

Hab. Sierra Leone.

In the Tring Museum 3 ♂♂ from : Pt. Lokkoh, Suza Country, Sierra Leone, July 1899 (Capt. Stevens), *type* ; Sierra Leone.

Named in honour of Capt. Stevens.

498. **Temnora subapicalis** spec. nov. (Pl. VII. f. 14, ♀).

♀. Closely resembling *marginata*, but differs as follows :

Upperside of tibiae less white ; apex of forewing more projecting, brown band much broader in middle, the interspace between second and third discal line less distinctly filled in with brown in costal area ; a subapical costal brown patch, at the distal and hinder sides of which the wing is somewhat cinnamon-rufous ; fringe buff behind between the veins ; hindwing darker and more uniformly brown than in *marginata*, brown marginal band vestigial.

Underside : both wings dark brown between submarginal line and edge of wing, while in *marginata* the marginal area is for the greater part of the same colour as the disc.

Hab. Kikuyu Escarpment, British East Africa, 6500 to 9000 ft., February 1902, (W. Doherty), 1 ♀, in the Tring Museum.

499. **Temnora marginata** (Pl. VII. f. 3, 4, ♂).

**Darapsa marginata* Walker, *List Lep. Ins. B. M.* viii. p. 185. n. 5 (1856) (Natal ;—Mus. Brit.).
Aspledon marginatum, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 307. n. 5 (1875) (Natal).
Diodosida marginata. Butler, *Trans. Zool. Soc. Lond.* ix. p. 553. n. 2 (1877) (Natal).
Lophuron marginatum, Kirby, *Cat. Lep. Het.* i. p. 642. n. 5 (1892) (Natal).
**Diodosida brunnea*, Rothschild, Nov. Zool. i. p 72 (1894) (Namaqualand ;—Mus. Tring).

♂♀. Similar to *murina* and *namaqua*. Upperside of tibiae white ; edges of abdominal sternites blackish laterally.——Forewing, *above*, with a broad discal band which is broadest at costal margin, narrowed to M^1, and somewhat widened again at distal margin, which it reaches between R^3 and SM^2.——Hindwing cinnamon-rufous, brown distal marginal border not conspicuous.

♂. Tenth tergite long and slender, gradually narrowed to end, which is rounded off ; sternite very much shorter than tergite, that means, not reaching so far distad, broad vertically and horizontally, truncate, bisinuate, mesial lobe short (Pl. XLIV. f. 45). Harpe broad, obtusely acuminate, compressed, upper surface somewhat concave (Pl. L. f. 21). Penis-sheath curved at end, the concave side with a long patch of teeth which is convex proximally ; the teeth sparser towards apical edge of sheath (Pl. LV. f. 48), or there are only a few subapical teeth and, a little towards the right side, a short dentate carina (Pl. LVI. f. 6).

Larva and pupa see above, p. 564.

Hab. South Africa ; Comoro Is.

Two subspecies.

a. T. marginata marginata (Pl. VII. f. 3, ♂).

**Darapsa marginata* Walker, *l.c.*

♂♀. The grey line within the brown discal band of the forewing above zigzag. Penis-sheath with a long patch of teeth (Pl. LV. f. 48).

Hab. South Africa.

In the Tring Museum 7 larvae, 2 pupae, 7 ♂♂, 4 ♀♀ from : Durban and Mooi R., Natal : Little Namaqualand, Cape Colony.

b. T. marginata comorana subsp. nov. (Pl. VII. f. 4, ♂).

♂. Grey line in brown discal band of forewing not zigzag; distal marginal area a little more extended brown below near apex. Penis-sheath: the patch of teeth vestigial; a short dentate carina towards the right side (Pl. LVI. f. 6).

Hab. Grande Comore.

In the Tring Museum 1 ♂ from Grande Comore (*type*); in coll. Charles Oberthür 1 ♂ also from Grande Comore (Humblot).

500. **Temnora argyropeza** (Pl. VII. f. 5, ♂).

**Chaerocampa argyropeza* Mabille, *Bull. Soc. Philom.* (7). iii. p. 135. n. 9 (1879) (Nossi-bé; coll. Mabille).
Oeyton tyrrhus, id., *Ann. Soc. Ent. France* p. 299 (1879) (= *argyropeza* ex errore).
Diodosida tyrrhus, Saalmüller, *Lep. Mad.* p. 121. n. 278 (1891) (= *argyropeza* ex err.).
Diodosida argyropeza, Kirby, *Cat. Lep. Het.* i. p. 642. n. 11 (1892).

♂. Differing from *marginata* especially in the first segment of the palpus and the hindtibia being marked with white scales, in the forewing having a grey stigma, more distinct discal lines and a posteriorly more restricted oblique shade-band; in the hindwing having no marginal band, being thinly edged with blackish brown and grey only behind; and in the basi-discal area of the forewing below being brighter cinnamon-rufous than the rest of the wing.

Tenth tergite strongly compressed, hence much narrower in ventral or dorsal aspect than in *marina*; sternite as broad as in *marina*, but simply truncate, not bisinuate. Harpe very much narrower than in *marina*. Penis-sheath similar, but less curved.

Hab. Madagascar.

In coll. Oberthür 2 ♂♂ from: Antsianaka (Perrot, in first half of 1892).

Typus from Nossi-Bé in coll. Mabille.

501. **Temnora funebris** (Pl. VII. f. 12, ♂, type).

**Diodosida funebris* Holland, *Ent. News* iv. p. 340. n. 7. t. 15. f. 4 (1893) (Benita;—coll. Holland); Kirby, Nov. Zool. i. p. 100. n. 8a (1894).

♂♀. Resembling *fumosa* in the elongate shape of the forewing, but nearer related to *marginata*, from which it differs in the much more oblique distal margin of the forewing, the proximally less sharply defined oblique discal band, and the cinnamon-brown distal border on the underside of both wings.

♂. Tenth tergite rather broad and flat, not much narrowed from middle to end, which is rounded; sternite shorter than tergite, triangular (Pl. XLIV. f. 48), rather broad proximally. Clasper as in *fumosa*, with four large friction-scales, covering a large groove clothed with minute scales; harpe as in *fumosa*, but longer and less pointed, differing widely from the broad harpe of *marginata*. Penis-sheath (Pl. LVI. f. 7) without external armature, but the membranaceous duct bears a curved dentate ridge, a kind of saw, which becomes visible when the duct is pushed out a little.

Hab. West Africa.

In coll. Holland from: Benita, Gabun.

In the British Museum 3 ♂♂ from Old Calabar.

502. **Temnora fumosa** (Pl. VIII. f. 5, ♂).

**Zonilia fumosa* Walker. *List Lep. Ins. B. M.* viii. p. 193. n. 3 (1856) (Congo ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 144. n. 9 (1875) (Guinea).

Diodosida fumosa, Butler, *Trans. Zool. Soc. Lond.* ix. p. 553. n. 3 (1877) (Congo) : Holl., *Trans. Amer. Ent. Soc.* xvi. p. 62. n. 13 (1889) (Kangwe, Ogowé).

♂ ♀. Palpus rather acuminate. Eye scarcely lashed. Spines of abdomen stronger than in the other species. Hinder edge of merum of midcoxa cariniform, angulate. Long terminal spur of hindtibia at least half the length of the first tarsal segment.——Forewing more distinctly banded in ♂ than in ♀, a large subbasal costal patch, an antemedian, nearly straight band of even width, and a broader discal band, which is widened in front, brown ; a triangular grey costal patch at the outerside of the discal band ; apex acute, distal margin even, sinuate below apex.

♂. Basal lateral scent-tuft of abdomen scarlet-pink. Tenth tergite narrow, tip a little curved downward, strongly convex, rounded ; sternite a little broader than the tergite, pointed. Friction-scales of clasper large ; harpe (Pl. L. f. 19) ending in a long, evenly curved, thin process. Penis-sheath (Pl. LV. f. 46) without process, but the left edge continued proximad as densely serrate ridge.

Hab. Aethiopian Region, inclusive of Madagascar.

Two subspecies :

a. T. fumosa fumosa.

**Zonilia fumosa* Walker, *l.c.*

Diodosida fumosa, Butler, *l.c.* ; Kirby, *Cat. Lep. Het.* i. p. 642. n. 8 (1892) (W. Africa).

Diodosida peckoveri, Möschler, *Abh. Senk. Naturf. Ges.* xv. p. 68. n. 151 (1890) (Accra, v.).

Diodosida fallax Rothschild, Nov. Zool. i. p. 72 (1894) (*nom. nud.*).

♂ ♀. The commonest form of the genus. It has not yet been found on the eastern side of the Continent, but occurs most likely also there in the wooded districts. Fresh specimens have a greenish tint, which fades into dark brown.

Hab. West Africa : Sierra Leone to Angola and the Aruwimi Forest.

In the Tring Museum 60-odd specimens from : Sierra Leone ; Gold Coast ; Niger ; Congo ; Angola ; Aruwimi R. (Ansorge).

b. T. fumosa peckoveri.

**Diodosida peckoveri* Butler, *Trans. Zool. Soc. Lond.* ix. p. 637 (1877) (Madagascar ;—Mus. Brit.) ; Saalm., *Lep. Mad.* p. 121. n. 280. t. 4. f. 41 (1884) (Nossi-bé) ; Kirby, *Cat. Lep. Het.* i p. 642. n. 12 (1892) ; Joann., *Ann. Soc. Ent. France* p. 432. n. 22 (1894) (Mahé).

Choerocampa peckoveri, Mabille, *Ann. Soc. Ent. France* p. 299 (1879) (Madag.).

♂ ♀. *Underside* of body deeper brown and wings rather broader than in the Continental form.

Hab. Madagascar ; Seychelles ; Comoro Islands.

In the Tring Museum 1 ♀ from : Grande Comore.

503. **Temnora sardanus** (Pl. VII. f. 13, ♂).

**Eugo sardanus* Walker, *List Lep. Ins. B. M.* viii. p. 116. n. 7 (1856) (Sierra Leone ; —Mus. Brit.).

Aspledon (?) sardanus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 308. n. 7 (1875).

Lophura sardanus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 537. n. 2 (1877) (Sierra Leone).

Aspledon sardanus, Plötz, *Stett. Ent. Zeit.* xli. p. 76. n. 281 (1880) (Ening, W. Afr.).

Eulophura sardanus, Holland, *Trans. Amer. Ent. Soc.* xvi. p. 58 (1889) ; Kirby, *Cat. Lep. Het.* i. p. 643. n. 2 (1892) (Sierra Leone).

**Diodosida uniformis* Rothschild, Nov. Zool. i. p. 72 (1894) (Sierra Leone ;—Mus. Tring).

♂ ♀. Eye-lashes not dense. External row of spines of foretarsus simple, with scarcely any additional spines at and near the normal ones, which are slightly prolonged ; upperside of foretibia brown like the body, abdominal sternites with a series of white dots towards each side, no dots at the lower edges of the tergites.

Body olivaceous drab brown, underside with a russet tint, palpus below somewhat paler, underside of tarsi pale buff.——Forewing, *above*, drab with greyish flush, a minute dirty white stigma, lines blackish olive ; a broad shadowy band of this colour obliquely across wing, its proximal edge rather well defined, concave behind and ending at tip of SM^2, distally the band gradually fades away, with the pale interspaces of the lines more or less distinct ; apex of wing acute, distal margin bisinuate, angulate at R^2, fringe paler between veins.—— Hindwing uniformly brown, lines vestigial in side-light, fringe buff, with brown vein-dots.

Underside russet-olive, basal half of forewing blackish olive, disc more or less walnut-brown, especially in ♀, three discal lines on both wings, first of forewing indistinct, distal margin with brown band, which is more distinct in ♀ than in ♂.

♂. Tenth tergite (Pl. XLIV. f. 40) feebly convex above, apex truncate-sinuate ; sternite obtusely acuminate. Friction-scales large, four in number ; harpe (Pl. L. f. 6) ending in a broad compressed process. Penis-sheath (Pl. LVI. f. 2) with the edge incrassate, the right edge proximally prolonged into a free, pointed process, the left edge dentate, without free process. Scent-tuft at base of abdomen pink.

Hab. Sierra Leone ; probably more widely distributed over the West Coast of Africa.

In the Tring Museum 6 ♂♂, 8 ♀♀ from Sierra Leone.

504. **Temnora plagiata** (Pl. VII. f. 20, ♂ ; 21, ♀).

Lophuron dicanus Boisduval, in Deleg., *Voy. Afr. Austr.* p. 594 (1847) (Natal ; *nom. nud.* ; hacc. spec. teste Boisd. 1875).
**Temnora plagiata* Walker, *List Lep. Ins. B. M.* viii. p. 105. n. 2 (1856) (Natal ;—Mus. Brit.).
**Panacra confusa* id., *l.c.* viii. p. 161. n. 10 (1856) (Natal ;—Mus. Brit.).
Oeyton confusum, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 304. n. 3 (1875) (Natal).
**Aspledon dicanus* id., *l.c.* i. p. 307. n. 4 (1875) (Caffaria ; Zululand ;—coll. Charles Oberthur).
Lophura plagiata, Butler, *Trans. Zool. Soc. Lond.* ix. p. 537. n. 1 (1877) (Natal : = *confusa*).
Lophuron plagiata, Kirby, *Cat. Lep. Het.* i. p. 641. n. 4 (1892) (Natal).
**Lophuron maculatum* Rothschild, Nov. Zool. i. p. 71 (1894) (Natal ;—Mus. Tring).

♂ ♀. Palpi obtuse. Antenna of ♂ heavy. Eye-lashes not dense. Hinder edge of midcoxal merum not cariniform. Upperside of tibiae like breast. Underside of abdomen with two series of brown dots.——Forewing, above : the pair of antemedian lines strongly curved, conspicuous, more or less filled in with brown ; a brown stigma divided by a pale line ; a large costal discal patch sharply defined, stopping at R^3, quadrangular, a smaller subapical costal patch, a submarginal spot R^3—M^1 ; distal margin bisinuate, strongly convex in middle, feebly denticulate, apex more or less acuminate.——Hindwing : olivaceous cinnamon rufous, or almost mummy brown, a more or less distinct brown postdiscal line, distal margin also brown ; fringe white, with brown vein-dots.

Underside nearly like upperside of hindwing, rather more grey, third discal line dentate on both wings, and distal marginal band olivaceous brown, but not conspicuous ; basal half of forewing rather more olivaceous than disc.

♂. Abdominal scent-tuft clayish. Tenth tergite (Pl. XLIV. f. 42) slender,

gradually narrowed to end, which is obtuse; sternite not much shorter than tergite in lateral view (appearing shorter in figure, which gives the segment in a distal ventral aspect), widest at the rounded apex. Harpe (Pl. L. f. 2) ending in a rather broad, apically incised and pointed process, which is much slenderer than in *inornatum*, *marginata*, *sardanus*, etc., but broader than in *murina*. Penis-sheath (Pl. LV. f. 51) with a dentate ridge as in several other species.

Hab. South and East Africa.

Two subspecies.

a. T. plagiata plagiata (Pl. VII. f. 20, ♂).

**Temnora plagiata* Walker, *l.c.*

♂♀. Body and forewing above russet, shaded with grey; distal margin of forewing very faintly denticulate.——Hindwing olivaceous cinnamon-rufous, postdiscal line distinct, interspace between it and marginal band brighter rufous.

Hab. Natal.

In the Tring Museum 2 ♂♂, 2 ♀♀.

b. T. plagiata fuscata subsp. nov. (Pl. VII. f. 21, ♀).

♀. Darker brown than the preceding; proximal posterior angle of the large costal patch of the forewing rounded; distal margin distinctly dentate; upperside of hindwing and under-surface olivaceous vandyke-brown, postdiscal line of hindwing, above, not distinct.

Hab. Kiknyu Escarpment, Brit. East Africa, 6500—9000 ft., January 1901 (W. Doherty), 1 ♀ in the Tring Museum.

505. Temnora atrofasciata.

Eudaphura atrofasciata Holland, *Trans. Amer. Ent. Soc.* xvi. p. 59. n. 6. t. 2. f. 3 (♂) (1889) (Benita: —coll. Holland): Kirby, *Cat. Lep. Het.* i. p. 643. n. 1 (1892).

**Lophuron umbrinum* Rothschild, *Iris* vii. p. 297. n. 1. t. 5. f. 4 (1894) (Sierra Leone; Cameroons; —coll. Staudinger).

♂♀. Palpi obtusely triangular. Eye-lashes rather heavy. Midcoxal merum somewhat angulate. Long terminal spur of hindtibia half the length of the first tarsal segment. First palpal segment white laterally.——Forewing, *above* without markings, except a large oblique discal band of an olivaceous mummy-brown colour, this band sharply defined, straight proximally, broadly sinuate distally, widest in front, no lines within band; distal margin entire, rounded, excised in front, apex obtuse. Underside of forewing cinnamon-rufous, basi-discal area blackish brown, marginal band vestigial at apex.——Hindwing paler than forewing.

♂. Scent-tuft of abdomen buff. Tenth tergite slender, convex above, not compressed, apex rounded; sternite broad, much shorter than tergite, truncate, incised, rough apically (Pl. XLIV. f. 41). Clasper with five large friction-scales: harpe short, truncate (Pl. L. f. 4). Penis-sheath (Pl. LV. f. 50) before apex with a lobe, directed proximad, free only at its extreme end and here denticulate, this lobe corresponding to the patch of teeth of other species.

Hab. West Africa: Sierra Leone to Ogowé R.

In the Tring Museum 4 ♂♂, 1 ♀ from Sierra Leone.

506. Temnora zantus.

Lophuron dorus Boisduval, in Deleg., *Voy. Afr. Austr.* p. 594 (1847) (Natal; *nom. nud.*; haec spec. teste Boisd. 1875); Kirby, *Cat. Lep. Het.* i. p. 641. n. 1 (1892).
**Lophura zantus* Herrich-Schäffer, *Ausser. Schmett.* i. t. 23. f. 105 (1854) (Cape Colony;—coll. Staudinger): Walk., *List Lep. Ins. B. M.* xxxi. p. 29 (1864).
**Eugo excisa* Walker, *List Lep. Ins. B. M.* viii. p. 119. n. 13 (1856) (Natal;—Mus. Oxford).
**Aspledon dorus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 305. n. 1 (1875) (Caffraria; Natal;—coll. Charles Oberthür).
Aspledon zanthus (!), id., *l.c.* p. 306. n. 2 (1875) (Caffraria).
Lophura? excisa, Butler, *Trans. Zool. Soc. Lond.* ix. p. 537. n. 3 (1877) (Natal).
Lophura zanthus, id., *l.c.* n. 7 (1877).
Lophura dorus, id., *l.c.* p. 632 (1877) (= *nana!* ex err.).
Lophuron zantus, Kirby, *l.c.* n. 2 (1892).

♂♀. Eye rather heavily lashed. External row of spines of first protarsal segment double or treble, at least at base. Hinder edge of merum of midcoxa cariniform, but not angulate. Long terminal spur of hindtibia not quite half the length of the first tarsal segment; this nearly equalling 2 to 4. Abdominal tergites with a white dot at lower edges; sternites with two rows of blackish spots. Apex of forewing truncate, distal margin lobate at R^3, M^1 and SM^2, hinder margin deeply concave before angle; apical area greyish, limited by a blackish brown band, which is straighter in ♀ than in ♂, and includes a brown costal spot generally followed by some dots; between this spot and the oblique band there are two lines, often fused to one.

♂. Scent-tuft of abdomen pale pink. Tenth tergite rather flat, feebly widened at end, which is rounded-truncate; sternite shorter than tergite, stout, vertically broad; apex acuminate, somewhat curved upwards, its upper surface carinate mesially, transversely ribbed. Clasper with five large friction-scales; harpe (Pl. L. f. 7) broad, obtuse, slightly spatulate. Penis-sheath (Pl. LVI. f. 13): membranaceous ventral area extending very far proximad; the chitinised dorsal area narrow, with a short apical carina at the left side.

Hab. Continental Africa.

Two subspecies:

a. T. zantus zantus.

Lophura zantus Herrich-Sch., *l.c.*

♂♀. Underside of body and wings russet, basi-discal area of forewing olive-brown. The distal edge of the oblique brown band of the forewing is generally incurved in ♂, seldom straight.

Hab. South and East Africa: Cape Colony to German East Africa.

In the Tring Museum 6 ♂♂, 7 ♀♀ from: Knysna, Cape Colony; Mooi R., Natal; Delagoa Bay; Mikindani, Germ. E. Afr.; Chipaika Estate, Bandawe, Nyassaland, i. '99 (Watkinson).

b. T. zantus apiciplaga.

**Pseudonyo apiciplaga* Karsch, *Ent. Nachr.* xvii. p. 291. n. 1 (1891) (Cameroons;—Mus. Berlin); Kirby, *Cat. Lep. Het.* i. p. 641. n. 2 (1892).

♂. Under surface much more reddish than in the eastern form. Not dissected.

Hab. Cameroons, 1 ♂ in the Berlin Museum; not seen in other collections.

507. Temnora natalis.

**Temnora natalis* Walker, *List Lep. Ins. B. M.* viii. p. 104. n. 1 (1856) (Natal ;—Mus. Brit.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 536. n. 1 (1877) (Natal) ; id., *l.c.* p. 632 (1877) (= *natalii*) ; Kirby, *Cat. Lep. Het.* i. p. 640. n. 1 (1892).
Temnora natalii (!), Boisduval, *Spec. Gén. Lép. Hét.* i. p. 290. n. 2 (1875) (Natal).

♂♀. Palpi short-triangular in dorsal view. Merum of midcoxa subcarinate. First hindtarsal segment as long as 2 to 4, twice the length of longer terminal hindtibial spur. Abdomen beneath with two series of brown dots, distal sternites variegated with brown. Distal margin of forewing irregular, deeply sinuate in front, dentate, the teeth rounded, apex and lobe R^2—R^3 truncate-sinuate ; antemedian lines very oblique, straight, curved only at costal margin ; a large, divided, discal costal patch and two arrowhead-shaped submarginal spots R^3—M^2 black. Lines of under surface irregular, strongly dentate, more or less interrupted, conspicuous.

♂. Tenth tergite slender, gradually narrowing to end, which is obtuse ; sternite also slender, rather flat, shorter than the tergite, rounded at end. Clasper with five large friction-scales ; harpe long, slender (Pl. L. f. 16), of the same type as in *fumosa* and *palpalis*. Penis with a broad dentate lobe which projects distad (Pl. LVI. f. 4).

Hab. South Africa : Natal.

In the British Museum 3 ♂♂ from Natal ; also in coll. Distant.*

508. Temnora spiritus (Pl. VII. f. 22, ♂, type).

**Oeyton spiritus* Holland, *Ent. News* iv. p. 339. n. 4. t. 15. f. 9 (♂) (1893) (Kangwé, Ogowé R. ;—coll. Holland).
Diodosida spiritus, Kirby, Nov. Zool. i. p. 100. n. 13 (1894).

♂. A pale insect, the four specimens known to us looking as if they were discoloured. Allied to *plagiata* in shape and markings. Long terminal spur of hindtibia about one-third the first tarsal segment, this nearly as long as the other four together. Clayish buff ; forewing above and under surface of body and wings creamy buff. Abdominal sternites without spots.——Forewing, *above*, with a large costal discal patch of an olivaceous clay colour, triangular, followed behind by a narrow band of the same colour ; a dentate submarginal line beginning at costal margin before apex, forming the border-line of a brownish marginal band ; distal margin denticulate, apex truncate-sinuate.——Hindwing much shaded with burnt umber-brown, postdiscal interspace pale, two brown lines more or less distinct, marginal band brown.

Underside of forewing brown from base to disc, marginal bands of both wings pale brown, that of forewing distinctly dentate, discal lines also dentate.

♂. Tenth tergite (Pl. XLV. f. 1. 2) strongly compressed, widened vertically near apex, curved downwards, pointed ; sternite much shorter than tergite, slender, pointed, curved. Clasper with five or six friction-scales ; harpe (Pl. L. f. 13) ending in a rather long, curved, somewhat twisted and spatulate process. Penis-sheath armed before end with a broad, lanceolate, flat process which projects obliquely distad and is dentate at the edges (Pl. LV. f. 54).

Hab. West Africa : Lagos ; Niger ; Ogowé.

In the Tring Museum 1 ♂ from : Warri, Niger Coast, July 1897 (Dr. F. Roth).

* An allied species described in the Appendix.

In the British Museum 1 ♂ from : Sapele, Niger. Another ♂, from Lagos, in coll. Druce.

The truncate apex of the forewing and the pale colour distinguish this species easily from *plagiata*.

509. **Temnora elegans** (Pl. VII. f. 6, ♂).

**Diodosida elegans* Rothschild, *Iris* vii. p. 298. n. 3 (1894) (Sierra Leone ;—coll. Staudinger).

♂ ♀. One of the prettiest species of the genus. Palpi triangular, pointed. Eye-lashes rather dense. Merum of midcoxa not carinate. Long terminal spur of hindtibia about one-third the length of first tarsal segment. Upperside of tibiae the same in colour as breast. Abdomen beneath with two rows of black dots. Distal margins of wings dentate ; that of forewing bisinuate, apex acute.——Hindwing bright orange-rufous, with a sharply marked marginal band. *Underside* of wings dull orange-rufous, hindwing shaded with grey : both wings with brown distal marginal band, which is half as wide again on the forewing as on the hindwing ; three discal lines on hindwing, distinct.

♂. Abdominal scent-tuft scarlet. Tenth tergite slender ; sternite very broad, sinnate, the lobes rounded (Pl. XLIV. f. 46). Harpe broad (Pl. L. f. 9), flattened, obtuse, of the same type as in *zantus*, *inornatum*, etc. Penis-sheath with an elongate patch of teeth (Pl. LV. f. 55) ; the duct, which is pushed out in the specimen figured, bears some setae at end and a strongly chitinised dagger-like spine.

Hab. Sierra Leone.

In the Tring Museum 3 ♂♂, 2 ♀♀ from : Sierra Leone ; one of the ♂♂ in August 1898 (Capt. Stevens).

510. **Temnora palpalis** spec. nov. (Pl. VII. f. 10, ♂).

♂. Similar to *crenulata*, rather more cinnamon-brown above, tawny-brown below. Antenna somewhat longer. First protarsal segment not longer than second and third together. Hind edge of midcoxal merum not distinctly cariniform. First segment of palpus with conspicuous white line at eye ; abdomen below without spots.——Forewing, *upperside* : apex rounded ; oblique discal band without pale distal border, widened at costal margin, its proximal edge sharper defined than in *crenulata*.——Hindwing : postdiscal line distinct behind ; costal margin obviously dilated near base.

Underside far more tawny than in *crenulata*, no buffish spots, lines feebly marked, obsolete in posterior half on both wings.

♂. Scent-tuft of base of abdomen scarlet. Tenth segment (Pl. XLV. f. 3) long ; tergite densely hairy, gradually narrowed to end, which is rather flat and rounded ; sternite longer than tergite, very slender, dilated at end and somewhat curved, hollowed out, ladle-shaped. Clasper with more than four large friction-scales, besides several small ones : harpe (Pl. L. f. 14) similar to that of *famosa*, ending in a gently curved, slender, pointed, minutely notched process. Penis-sheath (Pl. LV. f. 53) with the left edge incrassate and dentate.

♀. Not known.

Hab. Antanambé, Baie d'Antongil, Madagascar ; 2 ♂♂ in the Tring Museum, March and April 1897 (A. Mocquerys).

Easily recognised by the white line on the first segment of the palpus.

511. **Temnora crenulata** (Pl. VII. f. 11, ♂, type).

**Ocyton crenulata* Holland, *Ent. News* iv. p. 338. n. 3. t. 15. f. 8 (1893) (Batanga, Cameroons;—coll. Holland).
Diodosida crenulata, Kirby, Nov. Zool. i. p. 100 (1894).

♂ ♀. Drab, flushed with grey. Eye-lashes not dense. Palpus pointed. Hinder edge of mesocoxal merum cariniform; first row of spines of foretarsus simple, or proximally doubled. Underside of palpus, middle of breast, and legs greyish, tibiae without white stripe. Edges of abdominal sternites ferruginous, paler in middle, with a white dot at each side. Crest of head and thorax brown. Oblique discal band of forewing sharply defined *distally*, discal lines dentate, more or less interrupted; distal margin angulated at R^2, dentate.——Hindwing grey at anal angle; margin denticulate, fringe pale buff with dark vein-dots.——*Underside* with two conspicuous buff dots on forewing, one subapical, the other subanal.

♂. Scent-tuft at base of abdomen scarlet pink. Tenth tergite rather broad, not much narrowed to end, apex rounded, upperside feebly convex; sternite shorter than the tergite, obtuse, not pointed. Friction-scales large, four in number; harpe (Pl. L. f. 8) short, obtuse, apex somewhat recurved, upper edge concave, dilated and raised proximally into a pyramidal prominence. Penis-sheath (Pl. LVI. f. 3) with a slender process curved proximad and bearing a tooth at base.

Hab. West Africa: Sierra Leone; Cameroons.

In the Tring Museum 1 ♂, 2 ♀♀ from: Sierra Leone, June and Aug. 1898 (Capt. Stevens); Pt. Lokkoh, Suza country, Sierra Leone, July 1899 (Capt. Stevens).

The specimen figured is the type lent to us by Dr. Holland.

The distally sharply defined oblique band of the forewing, together with the dentate distal edges of the wing, enable one to distinguish this species easily from *sardanus*, while it can be differentiated at a glance from *zantus* by the acute apex of the forewing, the more evenly dentate distal margin, the darker under surface, etc.

512. **Temnora reutlingeri** (Pl. VII. f. 16, ♂, type).

**Ocyton reutlingeri* Holland, *Trans. Amer. Ent. Soc.* xvi. p. 61. n. 9. t. 2. f. 6 (1889) (Benita;—coll. Holland).
Diodosida reutlingeri, Kirby, *Cat. Lep. Het.* i. p. 642. n. 4 (1892).

♂. Palpus less pointed than in *crenulata*; eye-lashes denser. Tarsi slender, first segment of hindtarsus as long as 2 to 4 together. Underside of abdomen slightly pinkish, with a series of brown apical dots at each side; scent-tuft pale pink. Upperside of forewing more cinnamon than in *crenulata*; distal margin less angulate, not distinctly denticulate, fringe buff between veins, especially behind; oblique band more proximal than in *crenulata*: *proximally* sharply limited by a pale line; a conspicuous subapical, costal, brown patch. Fringe of hindwing buff, except at tips of veins. Underside without conspicuous markings, pale russet hazel; forewing olive brown from base to beyond cell, margin also brown, but this colour not forming a sharply defined and conspicuous band.

♀. Not known.

Hab. Benita, Gabun: 1 ♂ in coll. Holland: not seen in other collections.

513. **Temnora scitula** (Pl. VII. f. 19, ♂, type).

**Ocyton scitula* Holland, *Trans. Amer. Ent. Soc.* xvi. p. 60. n. 7. t. 2. f. 4 (1889) (Benita; – coll. Holland).
Diodosida scitula, Kirby, *Cat. Lep. Het.* i. p. 642. n. 2 (1892).

♂ ♀. Palpi rather obtuse. Eye-lashes not heavy. Hinder edge of midcoxal merum not cariniform. Long spur of hindtibia about half the length of the first tarsal segment. First segment of palpus, middle of breast, and two basal abdominal sternites more or less grey, sternites 3 to 6 with a conspicuous white apical mesial spot, which is also present on second sternite, but here less conspicuous owing to the greyish white scaling of this segment; tergites with pale edges, which almost develop ventrally into white tufts. Distal margins of wings entire, hindwing with vestiges of teeth. Forewing bisinuate, rounded in middle, apex acuminate; interspace between pair of antemedian lines posteriorly filled in with brown; an oblique brown discal band, sharply defined proximally, narrowed in middle; at its proximal edge there stands before M^2 a creamy dash, followed beyond M^2 by vestiges of one or two dots; a round creamy dot outside the band before R^3; a postdiscal costal brown triangular patch, sometimes prolonged to end of M^1, a brown marginal triangular spot SC^4—SC^5 followed by a broader marginal band ending in a point at R^3. Hindwing dark walnut brown, with a paler postdiscal narrow band, distal margin deeper brown.——*Underside*: a greyish brown border to both wings; forewing deeper brown than hindwing, with a subapical costal tawny-buff lunule, a round creamy dot before R^3, and an interrupted creamy line between M^1 and SM^2. ——Hindwing more greyish ferruginous, postdiscal interspace brighter.

♂. Abdominal scent-tuft buff. Tenth tergite (Pl. XLIV. f. 53) rather broad, not compressed, apex round; sternite triangular, apex obtuse. Harpe (Pl. L. f. 17) with a slender and straight process. Penis-sheath (Pl. LVI. f. 9) with a raised and curved patch of teeth, the right edge of the patch projecting, cariniform, dentate, the patch not extended to apex at left side.

Hab. West Africa.

In coll. Holland and the British Museum from Benita. In coll. Oberthür one small ♂ from Lolodorf, Cameroons (Conradt). In the Berlin Museum 1 ♀ from Togoland. Also in coll. Druce.

Easily recognised by the round dot R^2—R^3 on forewing.

514. **Temnora eranga** (Pl. VII. f. 17, ♂, type).

**Ocyton eranga* Holland, *Trans. Amer. Ent. Soc.* xvi. p. 61. n. 10. t. 2. f. 7 (♀) (1889) (Kangwé, Ogowé; – coll. Holland).
Diodosida eranga, Kirby, *Cat. Lep. Het.* i. p. 642. n. 5 (1892).

♂ ♀. Rather close to *scitula*. Underside of palpus, breast, and first two abdominal sternites whitish; the other sternites with white apical mesial spots.——Forewing less elongate than in *scitula*; oblique discal band narrower posteriorly; no round creamy discal dot, but there is a pale mark resembling the number 7 at the proximal side of the band before hinder angle; antemedian lines not distinctly filled in with brown, discal lines more obviously dentate than in *scitula*. Underside paler, especially along marginal band, where there is a series of pale spots, of which the costal one on forewing is enlarged.

♂. Tenth tergite (Pl. XLIV. f. 52) very much slenderer than in *scitula*.

compressed. (Harpe not preserved in the only specimen at disposal.) Penis-sheath with a patch of teeth nearly as in *elegans*, only shorter, differing from that of *scitula* in being almost symmetrical, narrow, well defined.

Hab. West Africa : Sierra Leone ; Ogowé R.

In the Tring Museum 1 ♂ from Sierra Leone.

515. **Temnora iapygoides** (Pl VII. f. 18, ♂, type).

**Ocyton iapygoides* Holland, *Trans. Amer. Ent. Soc.* xvi. p. 60. n. 8. t. 2. f. 5 (♂) (1889) (Benita, Gabun ;—coll. Holland).

**Ocyton preussi* Karsch, *Ent. Nachr.* xvii. p. 292. n. 2 (1891) Barombi, Cameroons ;—Mus. Berlin).

Diodosida iapygoides, Kirby, *Cat. Lep. Het.* i. p. 642. n. 3 (1892) ; Schaus & Clem., *Sierra Leone Lep.* p. 18 (1893).

Diodosida preussi, Kirby, *l.c.* n. 6. (1892).

**Pterogon clementsi* Rothschild, Nov. Zool. i. p. 69 (1894) (Sierra Leone ;—Mus. Tring).

♂ ♀. Similar to *cranga*. Underside of body less pale, abdominal sternites without distinct white spots, but the fringe grey except at sides. Band of forewing less sharply defined proximally ; no creamy mark before hinder angle, distal lines less dentate. Upperside of hindwing deeper cinnamon-rufous. Underside of wings without creamy buff spot along marginal band.

♂. Scent-tuft of abdomen creamy buff. Tenth tergite rather short, elongate-triangular, pointed ; sternite characteristic, being sinuate (Pl. XLIV. f. 43). Harpe elongate, almost straight, tapering, with a dentate crest on upperside (Pl. L. f. 3). Penis-sheath (Pl. LVI. f. 1) with two rows of teeth, one left, apical, the other right, longer and more proximal.

Hab. West Africa : Sierra Leone ; Cameroons ; Ogowé.

In the Tring Museum 6 ♂♂, 5 ♀♀ from Sierra Leone.

A ♂ from Cameroons in coll. Charles Oberthür, a ♀ from the same country in Museum Stockholm.

T. clementsi is based on an exceptionally pale ♂.

516. **Temnora pylas.**

Sphinx pylas Cramer, *Pap. Exot.* iii. p. 23. t. 206. f. A (1779) (Surinam !).

Enyo pylas, Hübner, *Verz. bek. Schm.* p. 132. n. 1417 (1822).

Lophura pylas, Walker, *List Lep. Ins. B. M.* viii. p. 106. n. 1 (1856) (Surinam !) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 538. n. 11 (1877) (partim).

**Lophura brisaeus* Walker, *l.c.* n. 2 (1856) (partim).

**Aspledon brisaeus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 308. n. 6. t. 8. f. 2 (♂) (1875) (partim) : Möschl., *Verh. Zool. Bot. Ges. Wien* xxxiii. p. 288. n. 84 (1884) (partim ?).

Lophuron pylas, Kirby, *Cat. Lep. Het.* i. p. 641. n. 3 (1892) (partim).

♂ ♀. The pair of antemedian lines of forewing, upperside, is distinct and more or less filled in with brown, forming a conspicuous, evenly curved band ; first and second discal lines vestigial in middle, angulate, filled in with brown at costal margin and also behind, the costal band-like portion less oblique than in the other species, and forming the proximal border of a grey triangular space, which includes two brown lines, area outside this triangular patch and disc of a vinaceous rufous tint ; apex rather obtuse ; no distinct tooth at SC^5. Brown marginal band of hindwing with a broad ferruginous border, which is, at R^1, about twice the width of the brown band ; postdiscal line marked only behind.

Underside uniformly ferruginous, with brown border, abdominal fold of hindwing yellowish near base.

♂. Abdominal scent-tuft vinaceous cinnamon. Tenth tergite nearly as in *namaqua* (Pl. XLIV. f. 47), slender, compressed, subprismatical, tip truncate-rounded; sternite about one-fourth shorter than tergite, with parallel sides in ventral aspect (Pl. XLIV. f. 55). tip truncate with the angles rounded. Harpe (Pl. L. f. 10) compressed, more or less suddenly narrowed to a short hook. Penis-sheath (Pl. LVI. f. 10) with a free process at right side, dentate at end, and a longer process at left side, this one not separate from the sheath, dentate all over.

Hab. Natal; Cape Colony.

In the Tring Museum 16 ♂♂, 8 ♀♀ from: Natal; Grahamstown, ix. x. 1901.

517. **Temnora pylades** spec. nov.

Lophura brisaeus Walker, *l.c.* (partim); Butl., *l.c.* (partim).
Aspledon brisaeus, Boisduval, *l.c.* (partim).
Lophura pylas, Butler, *l.c.* (partim).
Lophuron pylas, Kirby, *l.c.* (partim).
Lophuron pseudopylas Rothschild, *l.c.* (1894) (partim; no. 2).

♂♀. Like *pylas*, antemedian lines of forewing less distinct, not filled in with dark brown; an oblique brown discal band from costal to outer margin, straight proximally, the greyish costal space outside this band less distinct and smaller than in *pylas*, the submarginal area and the disc less vinaceous rufous; apex of wing more acute, angle R^3 more prominent and hinder angle more produced backwards; no distinct tooth at SC^5.

♂. Tenth segment shorter than in *pylas*, the sternite (Pl. XLIV. f. 5) obviously broader, slightly but distinctly sinuate, angles rounded. Harpe (Pl. L. f. 11) much slenderer than in *pylas*. Penis-sheath essentially the same as in *pylas*.

Hab. South Africa.

In the Tring Museum 11 ♂♂, 4 ♀♀ from: Natal and Cape Colony. *Type*: ♂, Natal.

518. **Temnora pseudopylas.**

Lophuron brisaeus, Boisduval, in Deleg., *Voy. Afr. Austr.* p. 594 (1847) (Natal; *nom. nud.*); Wallengr., *Kongl. Sv. Vet. Ak. Handl.* v. 4. p. 17 (1865) (Caffr. or.; partim?).
Lophura brisaeus Walker, *l.c.* (partim).
Aspledon brisaeus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 306. n. 3 (1875) (partim): Mœschl., *l.c.* partim?).
Lophura pylas, Butler, *l.c.* (partim).
Lophuron pylas, Kirby, *l.c.* (partim).
**Lophuron pseudopylas* Rothschild, Nov. Zool. i. p. 71 (1894) (partim; no. 1; *hab*?—Mus. Tring).

♂♀. Body above and below and upperside of forewing deeper brown than in *pylas* and *pylades*.——Forewing similar in pattern to that of *pylades*, the grey post-discal line outside the brown band angulate at SC^5, distal margin with distinct tooth SC^5. Brown marginal band of hindwing with umber-brown border; the veins streaked with brown. Under surface brighter in tint, more variegated with bright chestnut and yellow, on forewing especially along marginal band; costal areas of both wings obviously deeper brown than disc; costal margin of hindwing more dilated near base than in the previous species.

♂. Tenth segment as in *pylas*. Harpe much longer than in *pylas*, spatulate, curved (Pl. L. f. 12). Penis-sheath (Pl. L. f. 10, 12) differing in the right process

being broader and more extended dentate, or in the left one being more restricted dentate.

Hab. South and East Africa; Comoro Islands.

Two subspecies:

a. T. pseudopylas latimargo subsp. nov.

♂. Marginal band of hindwing broader than in the continental form, the brown line situated within band not only in front but also between R^3 and SM^2. Under surface bright reddish chestnut, with little ochreous yellow scaling. Harpe shorter than in two continental subspecies; penis-sheath (Pl. LVI. f. 12) with the left dentate ridge short, the teeth few in number.

Hab. Grande Comore.

One ♂ in coll. Oberthür, collected by L. Humblot.

b. T. pseudopylas pseudopylas.

**Lophuron pseudopylas* Rothschild, *l.c.*

♂♀. Marginal band of hindwing, above, bordered by the postdiscal line between R^3 and SM^2. Underside of fore- and hindwing much variegated with ochreous yellow.

♂. Harpe long (Pl. L. f. 15). Penis-sheath with the left ridge as densely dentate as in *pylas* (Pl. LVI. f. 10).

Hab. South and East Africa.

In the Tring Museum 21 ♂♂, 7 ♀♀ from: Namaqualand; Natal; Delagoa Bay; Kikuyu Escarpment, Brit. E. Afr., iii. iv. (Doherty); Masindi, Uganda, xii. i. (Ansorge); Butiti, Toro, iv. (Ansorge).

Our individuals from British East Africa have a slightly narrower and more heavily dentate forewing, and some have the ferruginous border to the brown marginal band of the hindwing replaced by brown as in the following species.

519. **Temnora leptis** spec. nov.

♂♀. This may ultimately turn out to be the West African representative of *pseudopylas*; but as it comes nearer *pylades* in the shape of the tenth abdominal sternite of ♂, we keep it specifically separate. Agreeing in the shape of the forewing with narrow-winged East African *pseudopylas*, apex truncate-sinuate, more produced at SC^5 than in *pseudopylas*; border of hindwing all brown: posterior three-quarters of hindwing, on underside, prominently marked with ochreous buff; submarginal band of forewing the same colour, or ochraceous rufous, conspicuous; costal margin of hindwing as in *pseudopylas*.

♂. Tenth sternite (Pl. XLIV. f. 56) rather deeply *sinuate*, the lobes acute. Harpe irregularly notched before end (Pl. L. f. 15). Right process of penis-sheath (Pl. LVI. f. 11) with teeth nearly all over.

Hab. Sierra Leone.

In the Tring Museum 5 ♂♂, 3 ♀♀ from: Sierra Leone: *type*: ♂.

No representative of this group of *Temnora* has as yet been found in West Africa between Sierra Leone and Cape Colony.

CXXXII. PSEUDENYO.—Typus : *benitensis*.

Pseudenyo Holland, *Trans. Amer. Ent. Soc.* xvi. p. 57 (1889) (type : *benitensis*) ; Kirby, *Cat. Lep. Het.* i. p. 644 (1892) (partim).

♂♀. Palpus longer than in *Temnora*, first segment twice as long as broad, second longer than first, acutely pointed. Fourth protarsal segment not longer than broad.——Forewing with apex truncate, distal margin sinuate between SC^5 and R^2, angulate at R^2 (not at R^3).

We have seen only the ♀ in the British Museum, presented by Dr. Holland. This specimen has the last four segments of the antenna (one only perfect) strongly compressed and broader than the fifth (from the tip), the last segment being the largest of the four. This peculiar structure is doubtless not normal for the species.

Hab. West Africa.

One species.

Perhaps not generically different from *Temnora*.

520. Pseudenyo benitensis.

Pseudenyo benitensis Holland, *l.c.* t. 2. f. 2 (♂) (1889) (Benita) ; Kirby, *l.c.* n. 1 (1892).

♂♀. Abdominal margin of the brown hindwing broadly yellow.

Hab. Benita, Gabun.

A ♀ (cotype) in the British Museum from : Benita.

CXXXIII. TEMNORIPAIS gen. nov.—Typus : *lasti*.

Pterogon, Rothschild (*non* Boisduval, 1836), Nov. Zool. i. p. 70 (1894).

♂. A development of *Temnora* ; antenna not inerassate distally, hook gradual, end-segment *short* ; hindtibia without comb (middle legs wanting in the only specimen known) ; clasper *without* friction-scales.——Differs from *Antinephele* in the much shorter palpus, sunken head, shorter pronotum, short basal spines of the third row of the first segment of the hindtarsus, the less obtuse apex of the forewing, distinctly angulate outer margin, and not rounded hinder angle. Differs from *Odontosida* in the not armed foretibia.

♀ and early stages not known.

Hab. Madagascar.

One species.

521. Temnoripais lasti.

**Pterogon lasti* Rothschild, *l.c.* t. 5. f. 5. (♂) (1894) (S.W. Madagascar ;—Mus. Tring).

♂. In appearance somewhat like *Temnora pylas*.——Forewing with a rather broad subbasal brown band, a brown discal line obliquely from costa to R^3, then backwards to middle of hinder margin, the brown scaling extended distad behind R^3 ; a minute white stigma.——Hindwing orange-ochraceous ; a broad blackish brown marginal band, bordered proximally with chestnut-tawny.

Tenth tergite and sternite of nearly equal length, both slender; tergite strongly convex above ; sternite gradually narrowed. Clasper without friction-scales, agreeing in this respect with *Odontosida*, *Gurelca*, and *Sphingonaepiopsis* ; harpe

(Pl. IL. f. 33) with a broad process which is proximally produced into a curved tooth, and is apically curved upwards, the upper hinder surface densely denticulate. Penis-sheath (Pl. LV. f. 36) with a short, pointed, nearly horizontal process at the right side, and a broad flat truncate process on the dorsal side towards the left, this broad process directed proximad, truncate, being widest at the end, with the angles produced laterad, and the edges dentate.

Hab. S.W. Madagascar (Last), one ♂ in the Tring Museum; not seen in other collections.

CXXXIV. ODONTOSIDA gen. nov.—Typus: *pusillus*.

Smerinthus, Felder (*non* Latreille, 1802), *Reise Novara, Lep.* t. 82 (1874).
Lophuron, Kirby (*non* Wallengren, 1865), *Cat. Lep. Het.* i. p. 641 (1892).

♂ ♀. Genal process very obtuse, shorter than pilifer; a tuft of scales below pilifer as in the allied genera. Palpus not projecting, with rough hair-scales at sides; patch of sensory hairs on innerside at the base vestigial. Head sunken, with mesial crest. Eye small, lashed. Antenna setiform in ♂, slightly incrassate beyond middle in ♀; end-segment *short*. Spines of abdomen weak, numerous. Mesum of midcoxa not angulate; foretibia ending in a *thorn*; midtarsus *without* comb; spurs of midtibia nearly equal in length. Distal margins of wings uneven or denticulate; hinder angle of cell of hindwing more or less acuminate.

♂. Clasper without friction-scales. Tenth sternite somewhat longer than the tergite.

♀. Vaginal plate truncate, angles rounded, orifice large, its anterior edge raised, smooth.

Early stages not known.

Hab. South Africa.

Easily recognised by the claw of the foretibia and the short end-segment of the antenna.

Two species:*

Base of hindwing yellow; forewing with blackish brown triangular patch including stigma	523. *O. magnificum.*
Hindwing pale rufous, basal area not yellow .	522. *O. pusillus.*

522. Odontosida pusillus.

**Smerinthus pusillus* Felder, *Reise Novara, Lep.* t. 82. f. 1 (1874) (Caffraria, Tsamo R.:—Mus. Tring); Boisd., *Spec. Gén. Lép. Hét.* i. p. 46. n. 38 (1875).
Triptogon? pusillus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 588. n. 17 (1877).
Lophuron pusillum, Kirby, *Cat. Lep. Het.* i. p. 642. n. 6 (1892).
**Lophuron pulcherrimum* Rothschild, Nov. Zool. i. p. 70 (1894) (Namaqualand:—Mus. Tring).

♂ ♀. Some specimens are far more grey on body and forewing, and have more conspicuous markings than others. The two forms intergraduate, however, as the series now in the Tring Museum shows, and are the same in structure; *pulcherrimum* sinks, therefore, as a synonym.

♂. Tenth tergite mesially grooved above, rather flat, convex at end which is rounded (Pl. XLIV. f. 37); sternite (*Xr*) broader than the tergite, not strongly chitinised, rather suddenly acuminate. Clasper rounded sole-shaped (Pl. IL. f. 28);

* For a third species see Appendix.

harpe very large, somewhat resembling the clasper in shape, at end near the dorsal edge densely beset with short spines. Penis-sheath with a heavy, triangular, horizontal process before end (Pl. LV. f. 38); penis-funnel with a slender process on each side.

Hab. South Africa: Cape Colony; Natal: Transvaal.

In the Tring Museum 19 ♂♂, 4 ♀♀ from: Grahamstown; Weenen and Mooi R., Natal, i.; Barberton, Transvaal.

523. **Odontosida magnificum.**

**Lopharon magnificum* Rothschild, Nov. Zool. i. p. 71. t. 5. f. 7 (♀) (1894) (Namaqualand;—Mus. Tring).

♂♀. Palpus smaller than in *pusillus*. Distal margin of forewing not crenulate, bisinuate, being convex in middle, apex obtuse; basal area of forewing below and of hindwing above orange.

♂. Tenth tergite flatter than in *pusillus*; sternite obviously longer, strongly compressed, narrow, curved upwards at end (Pl. XLIV. f. 38. 39, lateral and dorsal aspects). Clasper as in *pusillus*; harpe (Pl. IL. f. 29) much smaller, but of the same type, its upper edge spinose. Penis-sheath with process at apical edge and some teeth near base of process (Pl. LV. f. 37); penis-funnel somewhat produced ventrad; no processes.

Hab. South Africa: Cape Colony: Natal.

In the Tring Museum 9 ♂♂, 4 ♀♀ from: Little Namaqualand and Grahamstown, Cape Colony: Natal.

CXXXV. GURELCA.—Typus: *hyas*.

Lophura Walker, *List Lep. Ins. B. M.* viii. p. 105 (1856) (partim; type: *brisaeus* = *pylas*).
Perigonia id., *l.c.* xxxv. p. 1851 (1866) (partim; type: *stulta*).
Gurelca Kirby, *Roy. Dublin Soc.* (2). ii. p. 330 (1880) (partim; nom. nov. indescriptum loco *Lophurae* Herr.-Sch. indescriptae, type: *zantus*); id., *Cat. Lep. Het.* i. p. 643 (1892) (nom. nov. loco *Lophurae* Boisd. 1875 descriptae; type: *hyas*).

♂♀. Genal process triangular, obtuse, not reaching tip of pilifer. Palpus projecting, terminal surface triangular, almost quadrangular; scales laterally at apex of first segment prolonged, forming a kind of fan; basal patch of sensory hairs of inner surface absent. Eye strongly lashed; head crested, the crest divided into two carinae which converge behind. Antenna short, filiform in both sexes, strongly compressed in ♂, cylindrical in ♀: end-segment short, conical. Spines of abdomen numerous, in several rows, all elongate and weak; ♂ with expansible obtusely triangular anal tuft, ♀ with smaller truncate tuft. Mesum of midcoxa not carinate; all the tibiae with some *spines*; paronychium with the ventral lobes obliterated; no comb on tarsi, hindtarsus with few spines at base; spurs of midtibia almost the same in length, long terminal one of hindtibia about as long as third tarsal segment, or shorter, about a third or a fourth longer than the second terminal spur. Distal margin of forewing denticulate, deeper sinuate behind M^1; R^3 and M^1 close together, M^2 from near middle of cell: costal margin of hindwing broadly excised, C incurved at the sinus, approaching SC^2; this on a short stalk with R^1; R^2 from before centre of cell, lower angle of cell acute; D^3 longer than D^4.

♂. Tenth tergite compressed, slender, simple, pointed; sternite broad, triangular

or truncate. Clasper without friction-scales. Penis-sheath ending in a dentate process.

♀. Vaginal plate triangular distally, the distal edges somewhat incrassate and more or less elevate ; orifice free.

Larva tapering in front, with a dorso-lateral line, and below this oblique bands; horn figured by Butler as being very long and filiform, by Semper and by Moore as being rather stout and shorter than two segments : are, perhaps, Butler's figures representations of *masuriensis* instead of *hyas* ?

Hab. North Western India (known as far south as Mhow) to Japan, the Philippines and Java.

Two species.

Kirby proposed, without giving a definition, the name *Gurelca* in 1880 to replace the likewise nondescript name "*Lophura*, Herr Schäff. nom. preocc.," and enumerated under it three African and one Indian species. Herrich-Schäffer mentioned the name *Lophura*—corrupted from Boisduval's nondescript name *Lophuron*—only in connection with his *Lophura zantus* from East Africa. The type of the nondescript name of 1880 is, therefore, *zantus* for all those who, like Mr. Kirby, accept nondescript names as valid, and not *hyas*, as given by Kirby in his Catalogue.

For us nondescript names have no standing ; *Gurelca* of 1880 is not valid, while *Gurelca* of 1892 being said to replace *Lophura* as defined by Boisduval in 1875 (type : *hyas*) is the first not preoccupied defined term for the present Indian genus, and, therefore, the correct name.

524. Gurelca hyas.

**Lophura hyas* Walker, *List Lep. Ins. B. M.* viii. p. 107. n. 3 (1856) (Silhet ; Hongkong ; Java ; N. India ;—Mus. Brit.); Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 203. n. 607. t. 8. f. 4. 4a (*l., p.*) (1857) (Java) ; id., *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 310. n. 1 (1875) (Silhet ; Java ; Philippines) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 538. n. 8. t. 90. f 1. 2. 3 (*l. p.*) (1877) (Hongkong ; Silhet ; Java) ; Swinh., *Proc. Zool. Soc. Lond.* p. 434. n. 4 (1886) (Mhow, xi.) ; Cot. & Swinh., *Cat. Lep. Moths Ind.* i. p. 7. n. 40 (1887) (Sikhim : Mhow) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xliii. p. 101. n. 171 (1890) (E. Java, xi.).

Macroglossum geometricum Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 205. n. 607 (1857).

**Perigonia macroglossoides* Walker, *List Lep. Ins. B. M.* xxxv. p. 1851 (1866) (Darjiling :—coll. Atkinson, now in coll. Staudinger) : Moore, *Proc. Zool. Soc. Lond.* p. 676 (1867).

Pergesa ? *macroglossoides*, Butler, *Trans. Zool. Soc. Lond.* ix. p. 548. n. 9 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 10. n. 56 (1887).

Gurelca hyas, Kirby, *Proc. Roy. Dublin Soc.* (2). ii. p. 330 (1880) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 8. n. 33 (1892) (Silhet ; Assam ; Java) ; Kirby, *Cat. Lep. Het.* i. p. 643. n. 1 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 110. n. 173 (1892) (Hongkong ; Sikhim ; Silhet ; Mhow ; Java) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 359. n. 12 (1895) (Java) ; Semp., *Schm. Philipp.* ii. p. 405. n. 54. t. j. f. 1. 2 (*l., p.*) (1896) (Luzon ; Camiguin de Mindanao ; Palawan ; vii.—ix.) ; Leech, *Trans. Ent. Soc. Lond.* p. 291. n. 73 (1898) (partim) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 417. n. 173 (1898) (Sikhim and Bhutan, up to 5000 ft., v.—vii., xi. xii.).

Metopsilus (?) *macroglossoides*, Kirby, *Cat. Lep. Het.* i. p. 661. n. 22 (1892).

Gurelca macroglossoides, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 110. n. 175 (1892) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 417. n. 175 (1898) ("not seen").

♂ ♀. Border of hindwing of even width.

♂. Tenth tergite carinate above in middle ; sternite trapeziform, truncate, feebly impressed mesially on underside, edges only stronger chitinised. Harpe

(Pl. IL. f. 31) broadly spatulate, curving upwards at end. Penis-sheath with an apical process which projects obliquely distad and is dentate at the ventral edge. (Pl. LV. f. 39).

♀. Distal edge of vaginal plate very slightly raised ; orifice proximal.

Larva see above. Further research is necessary to explain the difference in the figures of Moore, Butler, and Semper.

Hab. North-Western India ; Mhow ; eastwards to Java and the Philippines.

In the Tring Museum 16 ♂♂, 5 ♀♀ from : Kelong, Formosa, viii. '96 (Jones) ; Khasia Hills, ii. iii. : Madras : Silhet : Java.

The type of *macroglossoides* is in coll. Staudinger (e coll. Atkinson) ; it is *hyas*.

525. Gurelca masuriensis.

**Lophura masuriensis* Butler, *Proc. Zool. Soc. Lond.* p. 244. n. 16. t. 36. f. 3 (1875) (Masuri ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 537. n. 4 (1877).

♂♀. Border of hindwing narrowing behind ; D^3 rather longer than in *hyas*. Fourth abdominal tergite with a large, interrupted, grey apical patch.

♂. Tenth sternite narrower at end than in *hyas*. Harpe (Pl. IL. f. 32) with a basal process which is hollow, open above ; distal part of harpe raised to a sinuate ridge ; above this there is on the clasper a hairy prominence. Penis-sheath (Pl. LV. f. 40) with a long flat process, curving proximad and round the sheath, lying flat upon this ; proximal edge with vestige of denticulation.

♀. Distal edge of vaginal plate projecting ; orifice beyond middle, transverse.

Hab. North-West India to Japan.

Two subspecies.

a. G. masuriensis masuriensis.

**Lophura masuriensis* Butler, *l.c.* ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 7. n. 37 (1887) (Sibsagar).
**Lophura himachala* Butler, *Proc. Zool. Soc. Lond.* p. 621. n. 1 (1875) (N.E. Himalayas ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 636 (1877) ; Cot. & Swinh., *l.c.* i. p. 8. n. 42 (1887).
**Lophura erebina* Butler, *Proc. Zool. Soc. Lond.* p. 621. n. 3 (1875) (N.W. India ;—Mus. Brit.) : id., *Trans. Zool. Soc. Lond.* ix. p. 636 (1877) ; Cot. & Swinh., *l.c.* i. p. 8. n. 43 (1887).
Gurelca masuriensis, Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 8. n. 32 (1892) (Masuri) ; Kirby, *Cat. Lep. Het.* i. p. 643. n. 2 (1892) ; Hamps., in Blanf, *Fauna Brit. Ind., Moths* i. p. 110. n. 174 (1892) (=*himachala*=*erebina*) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 417. n. 174 (1898) (Sikhim, from 1000 ft. upwards, v. vii.).
Gurelca himachala, Kirby, *l.c.* n. 5 (1892).
Gurelca erebina, id., *l.c.* n. 7 (1892).
Gurelca hyas, Hampson, *l.c.* f. 65 (1892).

♂♀. The dark Indian form, with broad distal border to hindwing.

Hab. North India : Massuri to Burma.

In the Tring Museum 33 ♂♂, 2 ♀♀ from : Darjiling ; Buxa, Bhutan ; Khasia Hills, iv. ; Cherrapunji, x.

b. G. masuriensis sangaica.

**Lophura sangaica* Butler, *Proc. Zool. Soc. Lond.* p. 621. n. 2 (1875) (Shanghai ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 636 (1877) ; Leech, *Proc. Zool. Soc. Lond.* p. 583. n. 9 (1888) (Satsuma, v. ; Nagasaki, vi. ; Fushiki & Shimonoseki, vii. ; Gensan, viii.).
Gurelca sangaica, Kirby, *Cat. Lep. Het.* i. p. 643. n. 6 (1892).
Lophura hyas, Alphéraky, in Rom., *Mém. Lép.* vi. p. 3. n. 69. t. 1. f. 2 (♂) (1892) (China).
Lophura masuriensis, id., *l.c.* ix. p. 119 (1897) (Se-tschuen).
Gurelca hyas, Leech, *Trans. Ent. Soc. Lond.* p. 291. n. 73 (1898) (partim).
Gurelca masuriensis, id., *l.c.* p. 291. n. 74 (1898).

♂♀. Forewing paler than in the Indian form; distal border of hindwing narrower, more strongly tapering behind.

Hab. China : Japan ; Corea ; apparently all the summer.

In the Tring Museum 22 ♂♂, 18 ♀♀ from : Nagasaki, vi. ; Satsuma, v. ; Yokohama, vi. vii. viii. ; Taipeh, Formosa ; China.

CXXXVI. SPHINGONAEPIOPSIS.—Typus : *nanum*.

Sphinx, Esper (*non* Linné, 1758), *Schmett., Suppl.* ii. p. 49 (1806).
Proserpinus Hübner, *Verz. bek. Schm.* p. 132 (1822) (partim ; type : *proserpina* = *oenotherae*).
Pterogon Boisduval, *Ind. Meth.* p. 32 (1829) (*nom. indescr.*) ; id., *Icon. Lép.* ii. p. 14 (1834) (partim, incl. type of *Proserpinus*).
Lophura Walker (*non* Flemming, 1822), *List Lep. Ins. B. M.* viii. p. 105 (1856) (partim).
Sphingonaepiopsis Wallengren, *Oefv. Vet. Ak. Förh.* xv. p. 138 (1858) (type : *nanum* = *gracilipes*).
Gurelca Kirby, *Cat. Lep. Het.* i. p. 643 (1892) (partim).

♂♀. A near relative of *Gurelca*, not of *Proserpinus*. Palpus rough-scaled, first segment with lateral apical fan as in *Gurelca*. Antenna (Pl. LX. f. 23. 24. 25. 29) dentate or pectinate in ♂, simple and clubbed in ♀ ; end-segment very *short*. Eye lashed. Head with scaling raised to a large tuft. Spines of abdomen very weak. Merum of midcoxa not angulate behind : tibiae with some long *spines* ; spurs of midtibia of nearly the same length ; midtarsus with basal comb, hindtarsus with few basal spines ; paronychium with the lateral lobes very small, the ventral ones absent : tarsi long. Distal margin of forewing irregular, M^2 at apical third of cell, M^1 and R^3 close together ; costal margin of hindwing nearly straight, convex near base, M^1 and M^2 close together, some distance from angle of cell, D^2 and D^3 straight, lower angle of cell not acuminate.

♂. Tenth tergite elongate triangular, apex more or less rounded-truncate ; sternite either similar to that of *Hypaedalia butleri* (Pl. XLIV. f. 36), strongly chitinised, with the upperside transversely ribbed distally, or short, broad, membranaceous. Clasper without friction-scales : harpe different in the various species. Penis-sheath without or with apical process.

♀. Vaginal plate triangular, apical edge projecting.

Larva cylindrical, with numerous short hairs ; head deeply impressed mesially ; horn short : on each side two dorsal and a ventro-lateral line from head to last segment resp. horn.—Food-plant : *Rubiaceae*, especially *Galium*.

Hab. South Russia to the Malay Peninsula and Madagascar.

Five species.

In the practical absence of both pairs of paronychial lobes *Sphingonaepiopsis* —a good mouthful, for such small insects too—is further advanced than *Gurelca*, in which the lateral lobes are preserved. The position of M^1 of hindwing close to M^2 is peculiar.

Boisduval's *Pterogon* of 1834, when he defined the genus, comprised several genera of Hübner's. His first section is identical with *Proserpinus*, containing the same species ; the second section is Hübner's *Enyo* ; while the third was probably meant to comprise some African *Nephelicae* and *Choerocampinae*.

Key to the species :

a. Hindwing brown . . . . . *b*.
Hindwing yellow or orange . . . . . *d*.

b. Abdomen with conspicuous white dorso-lateral spots . . . . . 526. *S. gorgon.*
Abdomen without such spots . . . . *c.*
c. Brown triangular patch of forewing above with pale line . . . . . 529. *S. nanum.*
Brown triangular patch of forewing above without pale line . . . . . 530. *S. obscurus.*
d. Forewing angulate at M^1, marginal band of hindwing thinning to a line behind . 527. *S. kuldjaensis.*
Forewing as before, abdomen without grey spots, marginal band of hindwing of even width . . . . . 528. *S. pumilio.*

526. Sphingonaepiopsis gorgon.

Sphinx legitima gorgon Esper, *Schmett., Suppl.* ii. p. 49. n. 86. t. 47. f. 5 (1806) (Wolga); Hubn., *Eur. Schm., Sphing.* t. 21. f. 102. t. 27. f. 124 (180–?).

Sphinx gorgon, Ochsenheimer, *Schmett. Eur.* ii. p. 119. n. 6 (1808).

Macroglossa gorgon, id. *l.c.* iv. p. 42. 175. n. 6 (1816); Treitschke, in Ochs., *Schmett. Eur.* x. p. 260 (1834).

Proserpinus gorgoniades Hübner, *Verz. bek. Schm.* p. 132. n. 1415 (1822); Walk., *List Lep. Ins. B. M.* viii. p. 98. n. 2 (1856).

Pterogon gorgoniades, Boisduval, *Ind. Meth.* p. 32 (1829); id., *Icon. Lép.* ii. p. 15. t. 48. f. 6 (1834); Mill., *Icon.* iii. t. 117. f. 3—5 (1870); Staud. & Wocke, *Cat. Lep.* ed. ii. p. 38. n. 492 (1871) (Ross. m. or., Pont.; Alt.; "Amur" *err. loci*); Boisd., *Spec. Gén. Lép. Hét.* i. p. 313. n. 3 (1875) (Wolga); Staud., *Hor. Soc. Ent. Ross.* xiv. p. 300 (1878) (Asia min.); Rom., *Mém. Lep.* i. p. 72 (1884) (Derbent); Christ., *ibid.* v. p. 11. n. 39 (1889) (Askhabad); Kirby, *Cat. Lep. Het.* i. p. 640. n. 6 (1892) (S. Russia); Hofm., *Raup. Grossschm.* p. 31 (1893) (v. vi.); id., *Grossschm.* t. 18. f. 8 (1894) (Wolga); Holtz, *Illustr. Zeitschr. Ent.* ii. p. 63 (1897) (Cilicia, viii.); Bartel, in Rühl, *Grossschm.* ii. p. 208 (1900) (Sarepta to Altai, southwards to N. Persia and Cilicia); Staud. & Reb., *Cat. Lep.* ed. iii. p. 104. n. 767 (1901) (Ross. m. or.; Pont.; Taur. m.: Arm.; Tura; Alt.).

Pterogon gorgon, Duponchel, *Lép. France, Suppl.* ii. p. 23. n. 6. t. 3. f. 2a. b (1835); Lucas, in Chenu, *Enc. Hist. Nat., Pap.* i. p. 256 (1853); Mén., *Enum. Corp. Anim. Mus. Petr., Lep.* ii. *Suppl.* p. 95. n. 1576 (1857) (Russ. m.); Staud. & Wocke, *Cat. Lep.* p. 17. n. 31 (1861).

Macroglossum gorgon, Eversmann, *Fauna Volgo-Ural.* p. 108 (1844) (Sarepta, v. vi.).

Proserpinus gorgon, Butler, *Trans. Zool. Soc. Lond.* ix. p. 536. n. 4 (1877).

Deidamia gorgoniades, Kirby, *Proc. Roy. Dublin Soc.* (2). ii. p. 330 (1880).

♂♀. Body and forewing grey: abdomen with three prominent white lateral dots; forewing sinuate behind M^1.

♂. Antenna dentate (Pl. LX. f. 23. 24. 25), the teeth short. Tenth tergite rather flat, convex above, apex rounded; sternite narrow, pointed. Clasper (Pl. LL. f. 22) sole-shaped; harpe short, dilated dorsad and distad at end. Penis-sheath with a long flat process just before apical edge, curved proximad and laterad, not dentate (Pl. LV. f. 41).

Larva green, with 6 white stripes, which are more or less edged with red.

Hab. South Russia to the Altai district and southward to North Persia and the Cilician Taurus.

In the Tring Museum, 1 larva, 13 ♂♂, 8 ♀♀ from South Russia; Kisyl Art.

527. Sphingonaepiopsis kuldjaensis (Pl. VII. f. 26, ♂).

Pterogon kuldjaensis Graeser, *Berl. Ent. Zeitschr.* xxxvii. p. 299 (1892) (Kuldja); Kirby, *Nov. Zool.* i. p. 100 (1894); Bartel, in Rühl, *Grossschm.* ii. p. 210 (1900).

Pterogon gorgoniades var. *kuldjaensis*, Staudinger & Reb., *Cat. Lep.* ed. iii. p. 104. n. 767a (1901) (Thian. oc.; Iss. K. s. oc.; ? Arm. trans.).

♂. Very near the preceding, but doubtless distinct. Larger ; hindwing orange ochraceous, with brown border which is irregularly dentate and is almost restricted to the fringe behind, tapering very strongly. Harpe (Pl. 1L. f. 37) curved upwards at end, flattened, with the apex recurved ventrad.

Hab. Central Asia : Kuldja ; Thian-shan, and neighbouring districts.

In the Tring Museum 1 ♂ from Kuldja, beginning of July.

528. Sphingonaepiopsis pumilio.

**Lophura pumilio* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 311. n. 2 (1875) (Silhet ;—coll. Charles Oberthür) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 632 (1877) ; Cotes & Swinh., *Cat. Moths Ind.* i. p. 7. n. 39 (1887).

**Lophura pusilla* Butler, *Proc. Zool. Soc. Lond.* p. 244. n. 17 (1875) (Silhet ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 537. n. 5 (1877) ; Moore, *Journ. As. Soc. Beng.* liii. 2. p. 234. n. 5 (1884) (Cachar) ; Cotes & Swinh., *l.c.* i. p. 7. n. 38 (1887) (Cachar).

Lophura minima id., *Proc. Zool. Soc. Lond.* p. 310. n. 4. t. 22. f. 4 (1876) (Ayerpanas, Malacca ;—where type ?) ; id., *Trans. Zool. Soc. Lond.* ix. p. 637 (1877).

Gurelca pusilla, Kirby, *Cat. Lep. Het.* i. p. 643. n. 3 (1892) ; Hamps., in Blanf, *Fauna Brit. Ind., Moths* i. p. 111. n. 176 (1892) (Cachar : Silhet : = *pumilio*).

Gurelca pumilio, Kirby, *l.c.* n. 4 (1892).

Gurelca minima, id., *l.c.* n. 8 (1892).

♂. Marginal band of hindwing of nearly even width. Body and forewing much more brown than in *gorgon* and *kuldjaënsis*, no white spots on abdomen.

Tenth tergite compressed, sharply pointed ; sternite also pointed. Clasper (Pl. 1L. f. 25) strongly narrowed in apical half, almost pointed, longitudinally grooved along dorsal edge ; harpe broad, densely beset with long spines distally, these spines flat upon the harpe except some at the apex. Penis-sheath without armature, or with short transverse subapical ridge, bent proximad.

Hab. Silhet ; Malay Peninsula ; Penang.

In the Tring Museum 1 ♂ from : Penang, Nov. 1896 (C. Curtis).

529. Sphingonaepiopsis nanum.

**Pteragon nanum* Boisduval, in Deleg., *Voy. Abyss. Illustr.* p. 594. n. 98 (1847) (*non inulescr.*) ; id., *Spec. Gén. Lép. Hét.* i. p. 314. n. 4 (1875) (Zululand ;—coll. Charles Oberthür) ; Kirby, *Cat. Lep. Het.* i. p. 640. n. 8 (1892) (Natal).

Lophura nana, Walker, *List Lep. Ins. B. M.* viii. p. 107. n. 4 (1856 (Natal) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 537. n. 6 (1877) ; id., *Proc. Zool. Soc. Lond.* p. 494. n. 43 (1884) (Aden, iv.).

Sphingonaepiopsis gracilipes Wallengren, *Wien. Ent. Mon.* iv. p. 42. n. 39 (1860) (Caffraria) ; id., *Kongl. Sv. Vet. Ak. Handl.* (2). v. 4. p. 19 (1865) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 585 (1877) (" not seen ") ; Kirby, *Cat. Lep. Het.* i. p. 705. n. 1 (1892).

(?) *Proserpinus nana*, Möschler, *Abh. Senk. Naturf. Ges.* xv. p. 67. n. 149 (1890) (Accra).

♂ ♀. Much more uniform in tint than *gorgon*, markings of abdomen vestigial.

♂. Tenth tergite similar to that of *gorgon* ; the sternite, however, short, broad, membranaceous, irregularly rounded-truncate, broader than long. Clasper sole-shaped (Pl. 1L. f. 23) ; harpe large, ventrally produced into a finger-like, flattened process, which is visible from outside, the apex of the harpe armed with spines which point ventrad and distad ; from a fold along dorsal margin of clasper, long bristles project obliquely ventrad. Penis-sheath without armature.

Hab. South Arabia to Natal ; and ? Gold Coast.

In the Tring Museum 15 ♂♂, 5 ♀♀ from : Aden, iii. ; Dar-es-Salaam ; Delagoa Bay ; Natal.

530. **Sphingonaepiopsis obscurus** (Pl. VII. f. 25, ♂).

**Pterogon obscurus* Mabille, *Ann. Soc. Ent. France* (5). ix. p. 344. n. 7 (1880) (Madag. ;—coll. Mabille).
Proserpinus obscurus, Saalmüller, *Lep. Madag.* p. 118. n. 274 (1884).
Pterogon (?) *obscurus*, Kirby, *Cat. Lep. Het.* i. p. 640. n. 7 (1892).

♂ ♀. Deeper brown than *nanum*.——Forewing without pale line upon cross-veins within brown triangular patch.

♂. Antenna pectinated, branches long and slender, scaled above, the inner ones rather shorter than the outer ones (Pl. LX. f. 29). Tenth tergite sharply pointed ; sternite long and narrow, similar to that of *gorgon*. Clasper narrowing towards apex (Pl. IL. f. 24) ; harpe slender, horizontal, ending in a spatulate process. Penis-sheath with dentate apical process pointing obliquely distad (Pl. LV. f. 42).

Hab. Madagascar.

In the Tring Museum 1 ♂ from : Antanambé, Baie d'Antongil (A. Mocquerys).

In coll. Oberthür from Tananarivo, 3 ♂♂, 2 ♀♀ (Camboué) ; Imerine, 1 ♂ (Camboué).

CXXXVII. MICROSPHINX gen. nov.—Typus : *pumilum*.

Pterogon Boisduval (*non* id., 1834), *Spec. Gén. Lép. Het.* i, p. 312 (1875) (partim).

♂. Differs from *Sphingonaepiopsis* in the following points : antenna obtuse at end, without hook, the end-segment being broader than long ; hindtibia with *one* pair of spurs, the longer one equalling in length the second tarsal segment.

Hab. South Africa.

One species.

531. **Microsphinx pumilum.**

**Pterogon pumilum* Boisduval, in Deleg., *Voy. Afr. Austr.* p. 594. n. 99 (1847) (Zululand, *nom. indescr.*) ; id., *Spec. Gén. Lép. Hét.* i. p. 312. n. 2. t. 9. f. 2 (1875) (Zululand ; Caffraria ;—coll. Charles Oberthür) ; Kirby, *Cat. Lep. Het.* i. p. 640. n. 9 (1892).
**Lophuron minutum* Distant, *Ann Mag. N. H.* (7). xix. p. 580 (1897) (Pretoria;—coll. Distant).
Sphingonaepiopsis pumilum, id., *Ins. Transv.* t. 3. f. 7 (1902).

♂. Forewing not angulate at M^1 ; marginal band of hindwing of even width ; abdomen with distinct lines and grey dots.

Hab. South East Africa : Cape Colony ; Caffraria ; Zululand ; Transvaal.

One ♂ in the British Museum from the Cape Colony.

CXXXVIII. EURYPTERYX.—Typus : *molucca*.

Dacopsa, Moore (*non* Walker, 1856), *Proc. Zool. Soc. Lond.* p. 794 (1865).
Eurypteryx Felder, *Reise Novara, Lep.* t. 74 (1874) (*nom. indescr.!*) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 46 (1875) (type : *molucca*).
Eucypteryx (*Pachylia*), Felder, *l.c.* expl. of plates p. 5 (1874).
Meuron, Oberthür (*non* Boisduval, 1875), *Et. Ent.* xix. p. 32 (1894).

♂ ♀. Genal process very large, reaching tip of pilifer. Eye slightly lashed. Head feebly crested. Palpus large, prominent, second segment longer than first, nearly as broad as long. Antenna long, setiform, compressed and grooved, and

furnished with fasciculated seriated ciliae in *both* sexes ; hook long and gradual ; end-segment conical, not prolonged into a filamentous process. Abdomen conical, ending in ♂ in a fan-tail which is truncate or triangulate ; spines elongate, rather strongly chitinised. Merum of midcoxa angulate ; tibiae simple, spurs unequal, long terminal one of hindtibia less than half the first tarsal segment, this equal to segments 2 to 4 ; midtarsus with moderate comb. Wings entire ; apex of forewing produced, hinder margin deeply sinuate, D^3 shorter than D^1 ; R^2 of hindwing in or before centre, D^3 longer than D^1.

♂. Tenth segment simple ; tergite densely hirsute (Pl. XLIV. f. 22), not compressed, slightly curved, apex rounded ; sternite almost as long as tergite, much broader, compressed, curved, higher than broad, apex transversely ribbed. Clasper broad, dorsal and ventral margin convex ; a patch of slender friction-scales ; harpe small (Pl. IL. f. 7. 8). Penis-sheath peculiar ; a very large flap covers the apex of the sheath dorsally, armed with two or more long teeth at the edge (Pl. LV. f. 15. 17) ; this flap is connected with the sheath by a short, subcylindrical stalk, and breaks easily off ; beneath the flap the sheath is dilated at the left side, subglobiform, and armed with short conical teeth (Pl. LV. f. 16).

♀. Vaginal plate narrow at end ; orifice large, edges raised.

Early stages not known.

Hab. Oriental Region.

Two species :

Forewing above with a large, buffish white, bean-shaped, costal discal patch	533. *E. molucca.*
Forewing above without this patch . . .	532. *E. bhaga.*

532. Eurypteryx bhaga.

**Darapsa bhaga* Moore, *Proc. Zool. Soc. Lond.* p. 794 (1865) (N.E. Bengal ;—Mus. Brit.) ; Walk., *List Lep. Ins. B. M.* xxxv. p. 1854 (1866).

Daphnis bhaga, Butler, *Trans. Zool. Soc. Lond.* ix. p. 573. n. 9 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 22. n. 115 (1887) (Sikhim) ; Kirby, *Cat. Lep. Het.* i. p. 672. n. 14 (1892) (Bengal) ; Hamps., in Blaof., *Fauna Brit. Ind., Moths* i. p. 96. n. 151 (1892) (Sikhim ; N.E. Bengal ; Singapore) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 24. n. 81 (1892) (Darjiling ; Singapore) ; id., *Trans. Ent. Soc. Lond.* p. 150. n. 30 (1894) (Shillong ; Cherrapunji) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 415. n. 151 (1898) (Sikhim ; Bhutan ; common at low elevat., 3000 ft., v.—vii.).

♂ ♀. This species resembles in colour the species of *Deilephila*, *hypothous* and *placida* especially, and has always been considered generically identical with them. However, *bhaga* belongs with *molucca* in one genus, being a distant derivation from *Nephele*.

♂. Tenth segment represented in lateral aspect by Pl. XLIV. f. 22. Harpe (Pl. IL. f. 7) truncate ; dorsal margin of clasper strongly convex. Penis-sheath (Pl. LV. f. 15, dorsal view) : lobe with long slender teeth all round ; globose dentate part of sheath large (Pl. LV. f. 16, ventral aspect).

♀. Not dissected. Antenna little thinner than those of ♂.

Hab. North India to Celebes.

Two subspecies :

a. E. bhaga bhaga.

**Darapsa bhaga* Moore, *l.c.*

Daphnis bhaga, Butler, *l.c.*

♂ ♀. Deep brown discal area of forewing not extended to subcostal fork ;

antemedian band with an obvious pale proximal border-line. Apex of hindwing evenly rounded, feebly pointed at SC^2.

Underside: forewing with a pair of rather heavy discal lines, the interspace between which is more or less filled in with brown, grey submarginal area rather well defined proximally by a brown line.

Hab. North India to Nias; will perhaps be discovered on Java and Borneo.

In the Tring Museum 18 ♂♂, 1 ♀ from: Buxa, Bhutan; Sikhim; Khasia Hills; Nias.

b. E. bhaga obtruncata subsp. nov.

♂. Distal margin of forewing more convex than in the previous; antemedian band without obvious pale proximal border; brown discal area extended to subcostal fork; black basal dot conspicuous.——Hindwing: costal margin straight from base to beyond middle, then rather sharply receding to tip of SC^2, the apex of the wing being obliquely truncate; anal angle more produced than in *bhaga bhaga*.

Underside: grey submarginal area of forewing sharply limited proximally only down to R^3, discal lines not distinct.

Not dissected.

Hab. Minahassa, N. Celebes (Platen), 1 ♂ in coll. Staudinger.

533. Eurypteryx molucca.

**Eurypteryx molucca* Felder, *Reise Novara, Lep.* t. 76. f. 1 (♀) (1874) (Ternate;—Mus. Tring); Boisd., *Spec. Gén. Lép. Hét.* i. p. 47 (1875); Kirby, *Cat. Lep. Het.* i. p. 677. n. 1 (1892); Huwe, *Berl. Ent. Zeit.* xl. p. 363 (1895).

Philampelus? molucca, Butler, *Trans. Zool. Soc. Lond.* ix. p. 578. n. 3 (1877).

**Aleuron bioratus* Oberthür, *Et. Ent.* xix. p. 32. t. 3. f. 16 (♂) (1894) (Andai;—coll. Charles Oberthür); Huwe, *l.c.* (1895).

Eurypteryx moluccae (!), Rothschild, *Iris* vii. p. 300 (1894)

♂♀. Distal margin of forewing slightly convex in ♀, straight in ♂, apex somewhat produced, but far less than in *bhaga*. Hindwing more rounded than in *bhaga*. Palpus more pointed. The buffish white costal patch of the forewing stands beyond the common stem of SC^1 and SC^5.

♂. Tenth sternite broader than in *bhaga*, the lateral edges widened laterad. Clasper less convex dorsally; harpe (Pl. 1L. f. 8) ending in a short conical process, which is not pointed. Penis-sheath (Pl. LV. f. 17): the apical flap armed distally with a long curved tooth, another tooth at the distal margin more proximal, small teeth at the right and left edges, the proximal part of the flap clothed with fine bristles (the most proximal portion of flap broken off).

♀. Vaginal plate small, edges incrassate; orifice not covered, edges raised but simple, neither dentate nor sinuate.

Hab. Northern Moluccas; New Guinea.

In the Tring Museum 1 ♂, 2 ♀♀ from: Ternate (*type*, coll. Felder); Kapaur, Dutch N. Guinea, Dec. '96 to Jan. '97 (W. Doherty); Sudest I., Louisiade Archipelago, April 1898 (A. S. Meek).

The *type* is much patched up, and the figure is very gross. It is a ♀, but to the end of the abdomen —which is stuck on and is not that of a Spinghid—are glued some ♂-segments, of which not much is left now, though, judging from Felder's figure, these end-segments were complete when the figure was drawn. The tuft has disappeared, but the penis is plainly visible, and this shows an armature which is certainly that of the ♂ *molucca*, though it does not quite agree with the figure we

give, which is drawn from our Sudest ♂. The flap bears a number of spiniform teeth, and is narrower and longer, approaching *bhaga* a little in dentition. We do not venture to explain when these ♂-segments were stuck on, and whence they came : but their presence is in so far of interest as they show that the armature of the penis-sheath is either individually or geographically variable. Further material must decide which alternative is correct, but it seems to us that the difference will turn out to be geographical, as our two New Guinea individuals are far more red beneath than the type of *moluccu*.

CXXXIX. GIGANTEOPALPUS.—Typus : *mirabilis*.

Eurypteryx, Rothschild (*non* Boisduval, 1875), *Iris* vii. p. 300 (1894).
Giganteopalpus Hnwe, *Berl. Ent. Zeit.* xl. p. 360 (1895) (type : *capito*=*mirabilis*).

♂ ♀. Differs from *Eurypteryx* chiefly in the following points : palpus much larger, second segment broader than long ; eye more heavily lashed, proportionally smaller ; abdominal spines weaker ; midcoxal merum not angulate ; costal margin of hindwing produced into a prominent antemedian lobe.

♂. Tenth tergite and sternite the same in length and breadth, with the sides parallel, the upperside of former and underside of latter slightly convex, and the apex of both rounded. Clasper small ; a large patch of obliquely erect friction-scales ; harpe of the type found in *Deilephila*, upperside concave, inclining towards clasper, apex somewhat curved upwards, obtuse (Pl. IL. f. 9). Penis-sheath (Pl. LV. f. 18) with a right and left process of nearly the same length, each shaped almost like the tail of a shark, dentate.

Early stages not known.

Hab. Sunda Islands.

One species.

534. **Giganteopalpus mirabilis.**

**Eurypteryx mirabilis* Rothschild, *l.c.* n. 11. t. 6. f. 3 (♀) (1894) (Kina Balu, ♂ ; Sumatra, ♀ ; —coll. Staudinger).
Giganteopalpus capito Hnwe, *l.c.* n. 13. t. 3. f. 1 (♂) (1895) (South Java, 1500 ft.).

The differences relied upon by Hnwe are not constant.

Hab. Borneo ; Sumatra ; Java.

In the Tring Museum 1 ♂ from Java merid., 1500 ft. (rec. from H. Fruhstorfer).

A ♀ from Sarawak, Borneo (Pryer) in the British Museum.

Two ♂♂, 1 ♀ from Tjampea, West Java, in coll. Snellen.

CXL. ANTINEPHELE.—Typus : *anomala*.

Nephele, Butler (*non* Hübner, 1822), *Ann. Mag. N. H.* (5). x. p. 434 (1882).
Antinephele Holland, *Trans. Amer. Ent. Soc.* xvi. p. 68 (1889) (type : *anomala*) ; Kirby, *Cat. Lep. Het.* i. p. 642 (1892) (partim).

♂ ♀. Genal process broad, obtuse, not reaching to end of pilifer. Palpi prominent, rounded in dorsal and in lateral aspect. Antenna filiform in both sexes, in ♂ strongly, in ♀ feebly compressed, basal seriated ciliae present in ♀, hook very gradually curved, end-segment *short*, conical, about three times as long as basally broad (side-view). Eye lashed Abdomen somewhat flattened, rather suddenly

acuminate, in ♂ with a slender and long mesial tuft ; spines numerous, elongate, weak. Merum of midcoxa not carinate behind ; mid- and hindtarsus with comb of long spines.

♂. Tenth segment not divided ; tergite narrow, long. Clasper with a small number of large friction-scales, the midrib of which is brown. Penis-sheath without external armature, but with a sharp stiletto inside, which can be pushed out (Pl. LV. f. 44).

♀. Vaginal plate rounded triangular ; orifice free, somewhat raised.

Early stages not known.

Hab. Aethiopian Region, exclusive of the Malagassic Subregion.

Six species.

Key to the species :

a.	A sharply marked oblique band on forewing from costal margin outside fork to outer margin before angle	*b.*
	Forewing without this band	*d.*
b.	Forewing clayish ochraceous	535. *A. marcida.*
	Forewing mummy brown	*c.*
c.	Distal line of antemedian band of forewing curving distad in front towards the postdiscal band	536. *A. anomala.*
	Distal line of antemedian band curving costad like first and second line	537. *A. achlora.*
d.	Abdomen below white, with brown mesial spots.	540. *A. maculifera.*
	Abdomen below without brown mesial spots .	*e.*
e.	Brown distal marginal area SC^5—M^1 of forewing limited by a straight white line. .	539. *A. lunulata.*
	Brown distal marginal area irregular ; no white line, or the line also irregular . .	538. *A. muscosa.*

535. **Antinephele marcida** (Pl. VII. f. 23, type).

**Antinephele marcida* Holland, *Ent. News* iv. p. 340 n. 6. t. 15. f. 7 (♂) (1893) (Benita ;—coll. Holland) ; Kirby, Nov. Zool. i. p. 100 (1894).

♂. The pale line on the posterior part of the mesonotum has the appearance of being the fringe of the tegula, which it is not ; it is present in all species, but the pale colour encroaches upon the edge of the tegula generally only in *maculifera*. Abdomen below without spots. Not dissected. Dr. Holland kindly lent us the type, of which we give here a figure.

Hab. Benita, Gabun.

One specimen (♂) in coll. Holland.

536. **Antinephele anomala.**

**Nephele anomala* Butler, *Ann. Mag. N. H.* (5). x. p. 434 (1882) (Aburi ;—Mus. Brit.).
Antinephele anomala, Holland, *Trans. Amer. Ent. Soc.* xvi. p. 69. n. 32 (1889) (Benita) ; Kirby, *Cat. Lep. Het.* i. p. 642. n. 1 (1892) ; Schaus & Clem., *Sierra Leone Lep.* p. 18 (1893).

♂♀. The antemedian band of the forewing resembles somewhat the band of *marcida*, but is very much narrower ; the proximal line of the postdiscal band is white and continuous, not broken up into distinctly separate lunules.

♂. Tenth tergite as slender as in *muscosa*, more evenly curved, far less curved than in *achlora*; sternite (Pl. XLIV. f. 33) with the lobe much smaller than in *achlora*, slightly spatulate. Harpe as in *achlora*, but quite straight.

Hab. West Africa.

In the Tring Museum 3 ♀♀ from: Ogrugu, Niger; Moy, Sierra Leone, 14. xi. 1901 (D. Cator).

537. Antinephele achlora.

**Antinephele achlora* Holland, *Ent. News* iv. p. 340. n. 5 (1892) (Benita); Schaus & Clem., *Sierra Leone Lep.* p. 18 (1893); Kirby, Nov. Zool. i. p. 100 (1894).

♂♀. Differs from the preceding in the three pale lines of the antemedian band of the forewing curving costad, in the proximal line of the postdiscal band being more or less separated into lunules, two of which are larger and white, in the russet underside of the abdomen, and some other points. The proximal abdominal sternites have a dark brown spot at the base.

♂. Tenth tergite (Pl. XLIV. f. 31. 32) long, strongly curved downwards, subcylindrical, not being strongly prismatically compressed; sternite (*Xe*) very much shorter than the tergite, flattened, tongue-shaped (Pl. XLIV. f. 32, ventral aspect). Harpe long (Pl. IL. f. 26), slender, straight, slightly curved upwards at end. Penis-sheath (Pl. LV. f. 44) on the innerside with a patch of sharp teeth (*d*), shining through.

Hab. West Africa.

In the Tring Museum 2 ♂♂, 3 ♀ from Sierra Leone.

538. Antinephele muscosa (Pl. VI. f. 14, ♂; 15, ♀).

**Antinephele muscosa* Holland, *Trans. Amer. Ent. Soc.* xvi. p. 70. n. 34. t. 2. f. 8 (♀) (1892) (Benita;—coll. Holland); Kirby, *Cat. Lep. Het.* i. p. 643. n. 3 (1892).

♂♀. We figure a cotype (♀) kindly lent to us by Dr. Holland, and a ♂ from the collection of Mons. Charles Oberthür. There are on the forewing a subbasal and an antemedian band, besides an oblique discal band crossing wing from costa just proximally of subcostal fork to outer margin, reaching this at end of M^2, from which band run backwards two more bands, all brown like hindwing: the brown marginal area is irregularly dentate, and in the ♂ figured bordered by a white line, which is not present in the other two individuals examined by us.

♂. Tenth segment as in the following, the tergite rather stouter and more evenly curved, and the sternite more obviously spatulate. Harpe as in *achlora*, much longer than in *lunulata*.

Hab. West Africa.

In the British Museum 1 ♂ from Benita presented by Dr. Holland.

A ♂ from Cameroons, Johann Albrechts Höhe (Conradt) in coll. Charles Oberthür.

539. Antinephele lunulata spec. nov. (Pl. VI. f. 16, ♀; 17, ♂).

♂♀. Differs from *muscosa* as follows:

Underside of body paler.——Forewing shallowly sinuate below apex in ♂; upperside: dark discal shade less distinct, at costal margin more proximal, at distal margin more frontal, the pale apical area reduced distally, no distinct bands; a basal and two discal spots brown, but not conspicuous, one distally of cell, the other between M^1 and M^2; discal lines strongly concave from apex of cell to hinder

margin, the first rather more distinct; a small brown apical halfmoon, followed by an elongate triangular marginal patch, pointed behind, proximally bordered by a white, feebly dentate line. On underside the pale postdiscal area of the forewing does not extend backwards beyond M^1, it includes proximally two brown dentate lines the angles of which point basad, and distally another more distinctly zigzag line, the angles upon the veins pointing distad; this line is separated from the brown border of the wing, while in *muscosa* it is merged together with it.

♂. Tenth tergite (Pl. XLIV. f. 34) slender, not strongly curved; sternite nearly as long as the tergite, narrow, pointed (Pl. XLIV. f. 35, ventral aspect). Harpe (Pl. IL. f. 27) short, ending in a sharp, evenly but not strongly curved hook. Penis-sheath without a patch of teeth on inner surface.

Hab. Mikindani, German East Africa, January to May 1897 (Reimer), 1 ♂, *type*; Lolodorf, Cameroons (Conradt), 1 ♀ in coll. Oberthür.

540. **Antinephele maculifera.**

Antinephele maculifera Holland, *Trans. Amer. Ent. Soc.* xvi. p. 69. n. 33. t. 3. f. 2 (♂) (1889) (Benita); Karsch, *Ent. Nachr.* xvii. p. 294. n. 4 (1891) (Cameroons); Kirby, *Cat. Lep. Het.* i. p. 642. n. 2 (1892).

♂♀. Dark brown mesothoracic tegula with a pale spot in front; abdominal tergites ochraceous, first with a dark brown mesial patch. A large triangular basal costal patch on forewing, two discal spots R^3—M^2 preceded by a smaller spot, an apical marginal halfmoon, and behind it a large marginal half-crescent dark brown. Underside of palpus and abdomen and middle of breast white, abdomen with conspicuous mesial spots.

Not dissected.

Hab. West Africa.

In the Tring Museum 1 ♀ from Lagos.

CXLI. HYPAEDALIA.—Typus: *insignis*.

Hypaedalia Butler, *Trans. Ent. Soc. Lond.* p. 397 (1877) (type: *insignis*).

♂♀. Genal process acute, about as high as pilifer. Palpus peculiar: scaling of second segment cariniform or anguliform laterally at apex, apical surface triangular, anterior (ventral) angle more or less projecting; third segment long, thin, scaled, close to the inner edge of the second segment. Scaling of head raised in front and projecting forward, lateral scaling forming a heavy eye-brow, a tuft at anterior lateral corner projecting forward upon palpus. Antenna filiform in both sexes; compressed also in ♀, with short seriated basal ciliae; end-segment short as in *Antinephele*. Abdomen broad, *flattened*, spines weak, in several rows; ♂ with a broad and rounded, ♀ with a narrow, anal tuft. Hinder edge of merum of midcoxa not carinate; external row of spines of first foretarsal segment irregularly doubled; mid- and hindtarsus with comb of rather long but thin spines. Forewing sinuate below apex; hindwing strongly rounded-dilated costally, the lobe widest in middle, quite gradually narrowing to base and apex, SC^2 and R^1 on a short stalk, R^2 a little before centre of cell.

♂. Tenth segment of abdomen of the same type as in *Antinephele*. Clasper with a patch of numerous friction-scales, which are much smaller than in

Antinephele and *Nephele*. Penis-sheath with two dentate apical processes, resembling those of *Nephele*.

♀. Not dissected.

Early stages not known.

Hab. West Africa.

Two species:

Abdomen blackish above, with a large, sharply defined, lateral, yellow patch . . . . 541. *H. insignis*.

Abdomen yellowish tawny olive above . . . 542. *H. butleri*.

The costal lobe of the hindwing projects beyond the costal margin of the forewing when the insect is at rest. The frenulum is well developed.

541. Hypaedalia insignis.

**Hypaedalia insignis* Butler, *Trans. Ent. Soc. Lond.* p. 398. t. 9. f. 3 (♀) (1877) Sierra Leone;—Mus. Dublin); Holl., *Trans. Amer. Ent. Soc.* xvi. p. 56. n. 3 (1889) (Benita, ♀); Kirby, *Cat. Lep. Het.* i. p. 633. n. 1 (1892).

♀. *Underside* of palpus and body, base of hindwing below, and a large lateral patch on third and fourth abdominal tergites orange. Basal area of forewing above and disc marked with conspicuous brownish black interrupted lines, separated by greyish interrupted lines, two larger acutely triangular spots more prominent, one between M^1 and M^2 close to cell, pointing basad, the other before end of SM^2, pointing distad: with these variegated areas contrast strongly a large, ovate, greyish patch before middle of hinder margin, a longer median costal olivaceous area, including the minute stigma, and the olivaceous apical area, which is divided by an oblique line.

Hab. Sierra Leone.

In the Tring Museum 1 ♀ from Sierra Leone.

542. Hypaedalia butleri.

**Hypaedalia butleri* Rothschild, Nov. Zool. i. p. 69. t. 6. f. 4 (♀) (1894) (Aburi;—Mus. Tring).

♂♀. The lines of the forewing are not conspicuous, the median area between the antemedian and discal lines is not separated into a costal and posterior portion, the whole wing almost uniform in colour. The underside of the forewing is cinnamon-rufous on disc: there is a sharply defined, irregularly dentate, brown marginal border: the costal margin of the hindwing is less dilated than in *insignis*; the costal area greyish; disc tawny, gradually shading into ochraceous towards base: hindwing longer than in *insignis*. Thorax above with a large green mesial patch which extends on head and is laterally bordered by a brown line. Palpus more pointed than in *insignis*, greyish cinnamon below. Breast and underside of abdomen buff-yellow; upperside of abdomen nearly gallstone-yellow.

♂. Tenth tergite shorter than in *Antinephele*, truncate; sternite broad, elongate, triangular (Pl. XLIV. f. 36). Clasper broad, sole-shaped; harpe (Pl. IL. f. 30) long, curved upwards and twisted at end, which is flattened and dilated. Penis-sheath (Pl. LV. f. 43) with two processes, which are dentate at end and curved proximad, the distal one short, the proximal one long.

Hab. Sierra Leone to Congo.

In the Tring Museum 2 ♂♂, 5 ♀ from: Sierra Leone; Aburi, Ashanti: Bopoto, Congo (Rev. K. Smith).

CXLII. RHODOSOMA.—Typus : *triopus*.

Macroglossa, Westwood (*non* Ochsenheimer, 1816), *Cab. Or. Ent.* p. 14 (1848).
Rhodosoma Butler, *Trans. Zool. Soc. Lond.* ix. p. 534 (1877) (typus : *triopus*).

♂♀. Genal process large, triangular, reaching tip of pilifer. Head with an indication of a mesial crest, smoothly scaled like thorax and abdomen. Eye lashed. Palpus broad but rather short, obtuse, resembling the palpus of *Macroglossum*, but not pointed. Antenna long and slender, setiform, cylindrical in ♀, hook gradually curved ; end-segment short, conical, with a number of long bristles, not produced into a filamentous process. Abdomen flattened, more so than in *Cizara ardeniae*, stumpy, appearing truncate, segments short, especially the last ones, sternites emarginate : spines flat, very *strong* on tergites and sternites, those of first row about half as long again as broad, rounded, this armature approaching that of *Macroglossum*. Merum of midcoxa not angulate or carinate ; tibiae simple, spurs unequal, longer terminal one of hindtibia less than half the first tarsal segment : this as long as segments 2 to 4 together ; hindtarsus with additional externo-lateral spines ; spines of comb of midtarsus slightly prolonged, stout ; pulvillus and paronychium normal. Wings entire : hindwing short, cell about half as long again as apically broad, cross-veins oblique, R^2 before centre, R^3 and M^1 almost from a point.

♂. Tenth segment elongate, slender, tergite scarcely curved, apex rounded ; sternite a little broader than tergite and somewhat shorter, with almost parallel sides, apex rounded, the apical edge curved a little upwards and appearing feebly sinuate in distal aspect. Clasper little curved, apex rounded, no friction-scales ; harpe of the same type as in *Rethera* and *Cizara*, the process nearly as broad as in *Cizara sculpta*, its ventral margin, which is bent upwards, serrate. Penis-sheath ending in a long, pointed, curved process (Pl. LV. f. 14).

♀. Vaginal plate narrowed at end ; orifice covered by a prominent proximal ridge, which is sinuate in middle.

Early stages not known.

Hab. North India.

One species.

543. Rhodosoma triopus.

**Macroglossa triopus* Westwood, *Cab. Or. Ent.* p. 14. t. 6. f. 4 (1848) (Assam, ♀ : Mus. Oxford) : Walk., *List Lep. Ins. B. M.* viii. p. 95. n. 18 (1856) (Silhet) ; Moore, *Proc. Zool. Soc. Lond.* p. 676 (1865) (Bengal) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 361. n. 48 (1875).
Rhodosoma triopus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 534 (1877) ; Maass., *Stett. Ent. Zeit.* xli. xli. p. 53 (1880) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 7. n. 36 (1887) ; Kirby, *Cat. Lep. Het.* i. p. 633. n. 1 (1892) (N. India) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 122. n. 208 f. 71 (♂) (1892) (Sikhim ; Assam) ; Swinh., *Cat. Lep. Het. Mus. Oc.* i. p. 8. n. 31 (1892) (Assam, *type*) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 419. n. 208 (1898) (Sikhim ; Bhutan).

♂♀. The creamy white stripes of the metanotum, the red interrupted belt and side-spots of the abdomen, the short ochraceous-yellow abdominal tufts, the square semivitreous spot of the forewing and the large white costal patch of the hindwing, as well as the rufous-red underside of the body and hindwings, give the insect a peculiar appearance.

Hab. Assam ; Bhutan ; Sikhim.

In the Tring Museum 16 ♂♂, 1 ♀ from : Buxa, Bhutan ; Sikhim ; Khasia Hills.

CXLIII. SPHECODINA.—Typus : *abbotti*.

Thyreus, Swainson (*non* Panzer, 1806), *Zool. Illustr.* iii. t. 60 (1821).
Pterogon, Thon (*non* Boisduval, 1834), *Naturg. Schm.* p. 104 (1837) (partim).
Sphecodina Blanchard, *Hist. Nat. Ins.* iii. p. 478 (1840) (type : *abbotti*).
Brachynota Boisduval, Cons. *Lép. Guatemala* p. 66 (1870) ; id., *Spec. Gén. Lép. Hét.* i. 330 (1875).
Maredus Kirby, *Journ. Roy. Soc. Dublin* (2) ii. p. 330 (1880) (type : *abbotti*).

♂ ♀. Abdomen flattened, with prominent side-tufts, tail broad in ♂, consisting of two broad side-tufts and a smaller mesial tuft, tail of ♀ not fan-like, consisting of a single prominent conical tuft. Midtarsus without comb, *i.e.* spines of fourth row not prolonged. Plate of seventh abdominal sternite very short, transverse. Fore-wing narrow, irregular. Only *abbotti* dissected.

♂. Tenth tergite and sternite simple, the latter incised at end (Pl. XLIV. f. 9). Clasper without friction-scales, narrowly sole-shaped, elongate, dorsal margin concave, curved inwards distally ; process of harpe short (Pl. XLVII. f. 11), more or less truncate and somewhat dilated at end. Penis-funnel (Pl. LIII. f. 31) armed with a rounded-dilated flat process, which is somewhat fan-like and is dentate at the edge.

♀. Vaginal plate similar to that of *Pachygonia* ; triangular, apical edges incrassate, orifice proximal.

Larva in first stage with horn, which is lost later on, being replaced by a polished tubercle : colour variable, green or brown, sometimes brown with large green patches above and at the sides (*abbotti*), or with two dorsal rows and an infero-lateral one of vinaceous-cinnamon patches (*caudata*).—Food-plants : *Vitis* ; *Ampelopsis*.

Pupa (*abbotti*) with obtuse frontal end, non-prominent caputal tubercles ; pro- and mesonotum finely rugose, not rough, mesial line slightly raised ; abdomen punctate-rugate, middle segments ventrally and laterally transversely irregularly multiplicate before the minutely granulose apical border, ninth tergite smooth, glossy, cremaster rough, triangular, ending in two minute points.

Hab. Eastern parts of Nearctic Region ; Amurland and China.

Two species.

544. Sphecodina abbotti.

Thyreus abbotti Swainson, *Zool. Illustr.* iii. t. 60 (*l., p., i.*) (1821) (Georgia) ; Hall, in Riley, *Ins. Life* i. p. 319 (1889) (Ohio).
Pterogon abboti, Thon, *Naturg. Schm.* p. 104. t. 52. f. 722. 723. 724 (1837).
Thyreus abboti (!), Harris, in Sillim., *Journ. Sci. Art* xxxvi. p. 307. n. 2 (1839) (Southern Sts. ; Mass.) ; Blanch., *Hist. Nat. Ins.* iii. p. 478 (1840) ; Chenu, *Enc. Hist. Nat.* i. p. 257. f. 475 (*l*). 456 (♂) (1851-53) ; Walk., *List Lep. Ins. B. M.* viii. p. 99. n. 1 (1856) (N. York ; Georgia) ; Clem , *Proc. Ac. N. Sc. Philad.* iv. p. 135. n. 12 (1859) (larva, pupa ; N. York ; Penn. ; Georgia ; Mass. ; Ohio) ; Morris, *Cat. Lep. N. Am.* p. 18 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 156. n. 1 (1862) ; Harris, *Ent. Corresp.* p. 284. t. 3. f. 9 (1863) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 151. n. 11 (1865) ; Pack., *Guide* p. 276. f. 203 (1869) ; Lintn., *Rept. N. York State Cab. N. H.* xxiv. p. 114 (1870) ; id., *Ent. Contr.* i. p. 191 (1872) (N. York) ; id., *l.c.* iii. p. 179 (1872) (N. York) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 19 (1874) ; Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., v. vi.) ; Boisd., *Spec. Gén. Lép. Hét.* p. 331 (1875) ; Grote, *l.c.* ii. p. 225. n. 21 (1875) ; Whitn., *Canad. Ent.* viii. p. 75 (1876) (♂ ♀ from brown larvae) ; Grote, *ibid.* viii. p. 100 (1876) (♂ ♀ from brown larvae) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 534 (1877) (Georgia ; N. York) ; Grote, *Bull. Buffalo Soc. N. Sc.* iii. p. 221. n. 23 (1877) (N. York ; Penn. ; Mass.) ; id., *Canad. Ent.* ix. p. 120 (1877) (Lake Erie) ; French, *Trans. Dept. Agric. Illin.* xv. p. 164 (1877) ; Saund., *Canad. Ent.* x. p. 130. fig. (*l.*)

(1878) ; Perk., *Rept. Verm. Agric. Soc.* v. p. 281. fig. (*l.*) (1878) ; Riley, *Rept. Ins. Missouri* ii. p. 78. fig. 54 (1879) (life hist.) ; Moff., *Canad. Ent.* xii. p. 211 (1880) (Lond., Can. ; Hamilton, Can.): Saund., *Rept. Ent. Soc. Ontario* p. 42. fig. (1880); Mart., *Trans. Dept. Agric. Illin.* xviii. *App.* p. 100 fig. (1880) ; Saund., *Canad. Ent.* xiii. p. 2. fig. 2 (1881) (life hist.) ; Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O., common) ; Sand., *ibid.* ii. p. 147 (1882) (larva beginn. June ; descr. first stage ; Grape, Ampelops.) ; Edw., *ibid.* iii. p. 25 (1883) (N. Jersey) ; Saund., *Ins. Inj. Fruits* p. 253. n. 135. fig. 263 (*l.*, *i.*) (1883) ; Fern., *Sphing. N. Engl.* p. 23. n. 8. t. 4. f. 4 (*l.*, *i.*) (1886) (Maine) ; Grote, *Hawk Moths N. Am.* p. 28 (1886) : id., *Canad. Ent.* xx. p. 154 (1888) (larva, noise) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 127. t. 5. f. 5. 6 (genit.) (1888) (Canada ; Eastern U. Sts., westward to Iowa) ; Edw., *Bull. U. S. Nat. Mus.* xxxv. p. 39 (1889) (liter. rel. to metam.) ; Fiske, *Ent. News* vii. p. 178 (1896) (sound of larva): Cross, *ibid.* vii. p. 297 (1896) (N. Hampshire) ; Rowl., *ibid.* x. p. 12 (1899) (Missouri) ; Peale. *ibid.* x. p. 1. figs. (*l.*, *p.*, *i.*) (1899).

Sphecodina abboti (?), Blanchard, *l.c.* t. 20. f. 4 (1840).

Brachynota abboti, Boisduval, *Cons. Lép. Guatemala* p. 66 (1870).

Marrdus abboti, Kirby, *Journ. Roy. Dublin Soc.* (2). ii. p. 330 (1880).

Sphecodina abboti, id., *Cat. Lep. Het.* i. p. 638. n. 1 (1892) (N. Am.) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 283. t. 2. f. 6 (1895) (N. York, common).

♂ ♀. Apex of forewing truncate, distal margin deeply bisinuate, denticulate at the veins. The extent of the primrose-yellow area of the underside of the hindwing variable.

Larva and pupa see above.

Hab. Eastern States of North America : from Canada east- and southwards to Georgia and the Mississippi basin.

In the Tring Museum 4 larvae, 2 pupae, 9 ♂♂, 12 ♀♀ from : Massachusetts ; N. Jersey ; Iowa.

It is strange that *abbotti* does not occur in the Pacific parts of the Nearctic Region, considering that the other species of *Sphecodina* inhabits the Pacific side of the Asiatic continent. What is the cause of the two peculiar moths having so widely separated ranges ?

545. Sphecodina caudata.

Macroglossa caudata Bremer & Grey, in Motsch., *Et. Ent.* i. p. 62. n. 18 (1852) (Pekin).

Thyreus caudata iid., *Schm. Nördl. China's* p. 13. n. 56 (1853) ; Mén., *Enum. Corp. Anim. Mus. Petr., Lep.* ii. p. 95. n. 1578. t. 12. f. 4 (1857) ; Staud., in Rom., *Mém. Lep.* vi. p. 238. n. 229. t. 6. f. 4 (*l.*) (1892) (Ussuri ; Sutschan ; larva on *Vitis*) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 105. n. 775 (1901).

Temnora (?) *caudata*, Walker, *List Lep. Ins. B. M.* viii. p. 105. n. 3 (1856) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 537. n. 9 (1877).

Macroglossa (?) *caudata*, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 332. n. 1 (1875) ; Bart., in Ruhl, *Grossschm.* ii. p. 214 (1900).

Sphecodina (?) *caudata*, Kirby, *Cat. Lep. Het.* i. p. 638. n. 2 (1892).

♂ ♀. Distal margin of forewing even, slightly concave in front and behind, not at all lobed. Abdomen more broadly tufted at end than in the preceding species ; the tail is too small in the figure given by Ménétriés, *l.c.*

♂. Not dissected.

Larva figured by Staudinger, *l.c.* ; at each side with a row of dorsal patches and a row of larger subventral ones.—Food-plant : *Vitis*.

Hab. Amurland and China.

Rare in collections.

A ♀ in the British Museum from Foochow.

CXLIV. DEÏDAMIA.—Typus: *inscriptum*.

Pterogon ?, Harris, in Sillim. *Journ. Sc. Art* xxxvi. p. 306 (1839).
Thyreus ?, Walker, *List Lep. Ins. B. M.* viii. p. 100 (1856).
Deïdamia Clemens, *Journ. Ac. N. Sc. Philad.* iv. p. 137 (1859) (type: *inscriptum*).
Proserpinus, Morris, *Cat. Lep. N. Am.* p. 18 (1860).
Trichocolon Boisduval, *Spec. Gén. Lép. Hét.* i. p. 302 (1875) (type: *inscriptum*).
Pterogon, Strecker, *Lep. Rhop. Het.* p. 112 (1876).

♂♀. Genal process triangular, narrower than in *Amphion*, nearly reaching end of pilifer. Head sunken, with a large mesial crest: eye lashed; palpus rather small, but projecting, rough-scaled. Antenna filiform, long and heavy in ♂, narrowed towards base and apex, gradually curved, no distinct hook; end-segment quite short, not prolonged to a filament, densely scaled above, the scales projecting beyond apex of segment. Spines of abdomen elongate, weak, especially those of underside; anal tuft small, triangular in ♂, truncate in ♀; seventh sternite of ♀ small, without spines, rounded. Merum of midcoxa not carinate or angulate; tibiae not spinose, rough-scaled, spurs unequal: no comb to midtarsus; paronychium with two pairs of lobes, pulvillus present. Apex of forewing truncate-sinuate, distal margin sinuate between SC^5 and R^3, and again between R^3 and hinder angle, with a small lobe at M^1; cross-veins of hindwing oblique, D^3 at least twice the length of D^1, upper angle of cell obtuse, lower angle acute.

♂. Tenth segment simple, tergite and sternite elongate, the latter broader and shorter than the former, somewhat boat-shaped. Clasper broadly sole-shaped, without friction-scales: harpe small, ending in a slightly curved, slender, somewhat spatulate process (Pl. IL. f. 10). Penis-sheath (Pl. LIV. f. 17) with a broad, apically wider left lobe, which is dentate at the edges, and with a simple pointed right process.

♀. Eighth tergite short, membranaceous in middle. Vaginal plate (Pl. XLI. f. 7) feebly chitinised, distal edge more strongly chitinised, apex narrowed: orifice subapical, large, anterior edge raised, sinuate.

Larva green, tapering in front, with a pale dorso-lateral line ending at the horn, which is granulose.—Food-plant: *Ampelŏpsis*; *Vitis*.

Pupa variegated with pale testaceous on the thorax and wing-cases; head with three prominent tubercles, mesial one pointed; tongue-case prominently keeled; thorax and abdomen with dispersed large punctures, which are denser together on the last segment, and the bases of the tergites, apex of segments 4 to 6 smooth ventrally; anal segment with a lateral prominence; cremaster shorter than in *Amphion*, less gradually tapering, conical part smooth.

Hab. Atlantic district of the Nearctic Region.

One species.

546. Deïdamia inscriptum.

Pterogon? inscriptum Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 306 (1839) (Indiana).
Thyreus? inscriptus, Walker, *List Lep. Ins. B. M.* viii. p. 100. n. 4 (1856).
Deïdamia inscripta, Clemens, *Journ. Ac. N. Sc. Philad.* iv. p. 137. n. 14 (1859) (Indiana; Long I.: N. York; Penn.); id., in Morris, *Syn. Lep. N. Am.* p. 159. n. 1 (1862); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 151. n. 13 (1865); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 20 (1874); id. *l.c.* ii. p. 225 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 535 (1877); id., *Papilio* i. p. 103 (1881) (affinities?); Pilate, *ibid.* ii. p. 66 (1882) (Dayton, O.); Grote, *Canad. Ent.* xviii. p. 131. n. 29 (1886) (Can., southward); Fern., *Sphinx. N. Engl.* p. 69. n. 33 (1886); Grote, *Hawk Moths*

N. Am. p. 29 (1886) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 284. t. 2. f. 7 (1895) (N. York) ; Moff., *Canad. Ent.* xxx. p. 204 (1898).

Proserpinus inscriptum, Morris, *Cat. Lep. N. Am.* p. 18 (1860).

Trichocolon inscriptum, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 302 (1875).

Pteragon inscriptum, Strecker, *Lep. Rhop. Het.* p. 112. t. 13. f. 8 (♂) (1876) (Middle and N. Engl. States, Maryld., Virg., Ohio, Ind.) ; Maass., *Stett. Ent. Zeit.* xli. p. 53 (1880) (*Deidamia* = *Pteragon*).

Deidamia inscriptum, Smith, *Trans. Amer. Ent. Soc.* xv. p. 129. t. 7. f. 3 (genit.) (1888) (Canada to Virginia, westward to the Mississippi Valley) ; Kirby, *Cat. Lep. Het.* i. p. 639. n. 1 (1892) (Indiana !).

♂ ♀. Resembles in colour and shape the South African *Odontosida pusillus*. The abdomen bears a row of brown dorso-lateral spots, corresponding to the dark markings found in *Acosmeryx*.

Hab. Canada to Virginia, westward to the Mississippi basin.

In the Tring Museum 2 larvae, 2 pupae, 11 ♂♂, 12 ♀♀ from : Long I. ; New York : Illinois.

CXLV. ARCTONOTUS.—Typus : *lucidus*.

Arctonotus Boisduval, *Ann. Soc. Ent. France* p. 319 (1852) (*nom. indescr.*) ; Walk., *List Lep. Ins. B. M.* viii. p. 264 (1856) (type : *lucidus*).

Proserpinus, Edwards (*non* Hübner, 1822), *Proc. Calif. Ac. Sc.* vi. p. 90 (1876).

♂ ♀. Very close to *Euproserpinus* and *Proserpinus*, though different in aspect owing to the more woolly scaling. Antenna *not* clubbed, narrowed to base and apex, very strongly compressed in ♂, hook gradually curved and narrowed, end-segment elongate-triangular, broader basally than in the allied genera. Palpus short, not projecting. Armature of tibiae as in *Euproserpinus*, spines of foretibia very long, apical thorn short ; *no* pulvillus, paronychium *vestigial*.

♂. Sexual armature (of *lucidus*) as in *Proserpinus* ; tenth sternite rather slenderer than in *P. clarkiae* (Pl. XLV. f. 4). Clasper elongate sole-shaped, curved as in *Proserpinus* ; harpe vestigial, represented by a tapering ridge as in *P. gaurae* (Pl. IL. f. 19). Penis-sheath with apical tooth as in *clarkiae*.

Early stages not known ; most likely similar to those of *Proserpinus*.

Hab. Pacific district of Nearctic Region, southward to Mazatlan, West Mexico.

The similarity to "*Bombycidae*" is quite superficial.

Two species :

Forewing with green subbasal patch ; basal two-thirds of hindwing pale vinaceous-cinnamon .	547. *A. lucidus*.
Forewing without green subbasal patch ; hindwing dull claret-red	548. *A. terlooi*.

547. Arctonotus lucidus.

**Arctonotus lucidus* Boisduval, *l.c.* p. 319. n. 85 (1852) (S. Francisco ; coll. Charles Oberthür) ; Walk., *List Lep. Ins. B. M.* viii. p. 265. n. 1 (1856) (Calif.) : Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 188. n. 95 (1859) ; Morris, *Cat. Lep. N. Am.* p. 18 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 217. n. 1 (1862) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 169. n. 117 (1865) ; Boisd., *Ann. Soc. Ent. Belg.* xii. p. 27. n. 86 (1869) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 17 (1874) ; id., *l.c.* ii. p. 225. n. 16 (1875) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 293 (1875) (S. Francisco) ; Streck., *Lep. Rhop. Het.* p. 113. t. 13. f. 7 (1876) : Edw., *Proc. Calif. Ac. Sci.* vi. p. 87 (1876 (Sacramento ; Oregon) : Butl., *Trans. Zool. Soc. Lond.* ix. p. 627 (1877) ; Grote, *l.c.* iii. p. 221. n. 18 (1877) ; Rivers, *Papilio* iii. p. 65 (1883) (Berkely, Cal. ; Jan. 7th and 8th at light) ; Grote, *Canad. Ent.* xviii. p. 131. n. 19 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 232 (1888) ; Kirby, *Cat. Lep. Het.* i. p. 714. n. 1 (1892).

♂♀. This insect flies early in the year, in Southern California early in January, in Oregon in February, in Washington in March; it comes to the light late at night. A specimen from South Arizona is dated September. This would show that there are either two broods, or that the imago hibernates. The Arizona example is paler than our other specimens.

Hab. Arizona northward to Washington Territory; perhaps also in British Columbia, from where it has not yet been recorded.

In the Tring Museum 18 ♂♂ from: So. Arizona, ix.; Los Angelos, California, i.; Gold Hill, Oregon, ii.; Pullman, Washington, iii.

548. **Arctonotus terlooi.**

Proserpinus terlooi Edwards, *Proc. Calif. Ac. Sc.* vi. p. 90 (1876) (Mazatlan, Mexico); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 5. n. 1 (1881); Kirby, *Cat. Lep. Het.* i. p. 640. n. 5 (1892).
Pterogon terlooi, Strecker, *Lep. Rhop. Het.* i. p. 125. t. 14. f. 2 (1877).
Arctonotus (?) terlooi, Smith, *Trans. Amer. Ent. Soc.* xv. p. 109 (1888) (an ally to *Arctonotus*).

♂. The much redder hindwing distinguishes this species at a glance. We cannot understand why Edwards put it into *Proserpinus*.

Hab. Mazatlan, Mexico.

In the collection of the California Academy at San Francisco.

CXLVI. AMPHION.—Typus: *nessus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* ii. p. 16 (1777).
Amphion Hübner, *Verz. bek. Schm.* p. 135 (1822) (partim; typus: *nessus*).
Thyreus ?, Harris, in Sillim, *Journ. Sc. Art* xxxvi. p. 308 (1839).
Thyreus, Walker (*non* Swainson, 1821), *List Lep. Ins. B. M.* viii. p. 99 (1856).

♂♀. Genal process large. Palpus pointed, projecting forward. Eye strongly lashed. Antenna filiform, slightly incrassate beyond middle, hook long, gradually narrowed, not or little compressed, end-segment quite short, not produced into a filamentous process. Mesum of midcoxa rounded: foretibia with slender spines externally, irregularly arranged, midtibia also with some spines; no comb to midtarsus: paronychium with two pairs of lobes; spurs very unequal. Spines of abdomen all elongate, strong above and below, flat; fan-tail broad in ♂, trilobate, the middle lobe thin; in ♀ more truncate, with the middle lobe a little projecting. Distal margin of forewing bisinuate; cross-veins of hindwing transverse, *not* oblique, lower angle of cell a little more than 90°, R^3 and M^1 rather close together.

♂. Tenth segment of abdomen simple, sternite shorter than tergite, both slender, slightly narrowed to apex, which is rounded. Clasper without friction-scales, ventral edge convex, dorsal one concave; harpe ending in a short, flat, obtuse process, projecting ventrad beyond the edge of the clasper (Pl. IL. f. 17). Penis-sheath (Pl. LIV. f. 15) with prominent, recurved, and pointed apical process.

♀. Eighth tergite five times as broad as mesially long, sides projecting as broadly rounded lobes. Vaginal plate feebly chitinised, distal edge somewhat incrassate, apex suddenly narrowed; orifice large, median, with the edges slightly raised.

Larva (adult) brown, thorax with three darker brown dorsal lines, following segments with a dorsal mesial row of brown spots and oblique brown side-bands;

young larva paler, with a pale dorso-lateral line from head to horn ; this colour sometimes retained by the later stages. Horn short, pointed ; thorax somewhat tapering frontad, especially in adult larva.—Food-plants : *Epilobium* ; *Ampelopsis* ; *Vitis*.

Pupa opaque, rugose, abdomen very strongly punctured, punctures of last segments deep ; head at each side with a smaller tubercle at the base of the tongue-case, and a larger but less projecting prominence before the eye ; cremaster long, bifid, very strongly rugate at base, smooth at apex.

Hab. Atlantic district of Nearctic Region.

One species : rather common ; flying at day-time, rarely at dusk.

Near *Proserpinus*, from which it differs in the antenna, the armature of the tibiae, and the direction of the cross-veins of the wing, etc.

549. Amphion nessus.

Sphinx nessus Cramer, *Pap. Exot.* ii. p. 16. t. 107. f. D (1777) (Virginia) ; Fabr., *Spec. Ins.* ii. p. 140. n. 2 (1781) : id., *Mant. Ins.* ii. p. 92. n. 2 (1787) : Gmel., *Syst. Nat.* i. 5. p. 2372. n. 91 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 355. n. 2 (1793) ; Lep. & Serv., *Enc. Méth.* x. p. 465. t. 66. f. 1 (1825).

Sphinx orygte, Houttuyn (*non* Linné, 1758), *Naturl. Hist.* i. 11. p. 408. n. 4. t. 90. f. 1 (1767) ; Müll., *Naturs.* v. 1. p. 636. n. 4. t. 20. f. 1 (1774) (N. York) ; Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 129 (1882) (= *nessus*).

Amphion nessus, Hübner, *Verz. bek. Schm.* p. 135. n. 1444 (1822) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 151. n. 12 (1865) ; Beth., *Canad. Ent.* i. p. 10. 47 (1869) ; Bowl., *ibid.* iii. p. 143 (1871) (Quebec, vii.) ; Lintn., *Ent. Contr.* i. p. 192 (1872) (N. York, vi.) ; Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., E. v.—M. vi.) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 19 (1874) ; id., *l.c.* ii. p. 225. n. 20 (1875) ; Caulf., *Canad. Ent.* vii. p. 241 (1875) (Montreal, vi. vii.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 535 (1877) ; Grote, *l.c.* iii. p. 221. n. 22 (1877) (N. York ; Can. ; Mass. ; Penn.) ; Jew., *Canad. Ent.* xii. p. 231 (1880) (Ohio, larva on *Epil. color.*) ; Pilate, *Papilio* ii. p. 66 (1882) (Dayton, O.) ; Sand., *ibid.* ii. p. 147 (1882) (larva, first stage) ; Fern., *Canad. Ent.* xvi. p. 21 (1884) (Orono, Maine) ; id., *Sphing. N. Engl.* p. 20. n. 7 (1886) ; Holl., *Canad. Ent.* xviii. p. 102 (1886) (Pittsburgh) ; Grote, *ibid.* p. 131. n. 24 (1886) (Can., southward) ; id., *Hawk Moths N. Am.* p. 28 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 125. t. 5. f. 3. 4 (genit.) (1888) (Canada to Georgia ; westward to Missouri, Iowa, Illinois) : Edw., *Bull. U. St. N. Mus.* xxxv. p. 38 (1889) (liter. rel. to metam.) ; Kirby, *Cat. Lep. Het.* i. p. 638. n. 1 (1892) ; Beutenm., *Bull. Amer. Mus. N. H.* vii. p. 282. t. 2. f. 5 (1895) (N. York, v. vi.) ; Soule, *Psyche* vii. p. 212 (1895) (larva on *Ampel. veitchi* ; Massachusetts) ; Cross, *Ent. News*, vii. p. 297 (1896) (N. Hampshire).

Thyreus? nessus, Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 308. n. 3 (1839).

Thyreus nessus, Walker, *List Lep. Ins. B. M.* viii. p. 99. n. 2 (1856) (N. York ; Orilla) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 136. n. 13 (1859) ; Morris, *Cat. Lep. N. Am.* p. 18 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 157. n. 2 (1862) : Dimm. & Mann, *Psyche* ii. p. 67 (1877).

Pogocolon nessus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 316. n. 3. t. 1. f. 5. 6 (*l., p.*) (1875).

Thyreus (*Amphion*) *nessus*, Andrews, *Canad. Ent.* ix p. 19 (1877) (larva).

♂♀. The yellow basal belts of the abdominal tergites 5 and 6, and the white fringe of the fourth tergite distinguish this insect easily from all other *Sphingidae*. In the pattern of the wings *nessus* comes near the species of *Proserpinus*.

The southern individuals, especially those from Florida, are on the whole deeper in tint than the northern ones.

Hab. Canada to Florida, westward to the Mississippi basin.

In the Tring Museum 4 larvae, 1 pupa, 22 ♂♂, 16 ♀♀ from : Maine ; Massachusetts ; Long Island ; N. Jersey : W. Virginia ; Sanford, Florida, vi. ; Titusville, Florida, viii.

CXLVII. PROSERPINUS.—Typus: *proserpina*.

Sphinx, Pallas (*non* Linné, 1758), *Spic. Zool.* ix. p. 26 (1772).
Sesia Fabricius, in Illig., *Mag. Ent.* vi. p. 88 (1807) (partim).
Macroglossa Ochsenheimer, *Schm. Eur.* iv. p. 42 (1816) (partim).
Proserpinus Hübner, *Verz. bek. Schm.* p. 132 (1822) (type: *proserpina* = *oenotherae*).
Pterogon Boisduval, *Icon. Lép. Eur.* ii. p. 14 (1834) (partim).
Thyreus, Walker (*non* Swainson, 1821). *List Lep. Ins. B. M.* viii. p. 100 (1856) (partim).
Lepisesia Grote, *Proc. Ent. Soc. Philad.* v. p. 38 (1865) (type: *flavofasciata*).
Pogocolon Boisduval, *Spec. Gén. Lép. Hét.* i. p. 314 (1875) (type: *gaurae*).
Dieneces Butler, *Ann. Mag. N. H.* (5) viii. p. 308 (1881) (type: *clarkiae*).

♂ ♀. Genal process large, triangular, nearly reaching to tip of pilifer. Eye-lashes heavy. Antenna clubbed: hook suddenly narrowed; end-segment conical, at least three times as long as basally broad. Abdominal spines weak; anal tuft truncate, preceding segments with side-tufts. Hinder edge of merum of midcoxa rounded, neither angulate nor cariniform; tibiae spinose; foretibia ending in a thorn, a lateral row of heavy spines, the basal ones the shortest; spurs of mid- and hindtibiae unequal, longer ones equalling or surpassing in length second tarsal segment; no comb to mid- and hindtarsus; ventral lobes of paronychium very small; pulvillus present. R^2 of hindwing central; R^3 and M^1 rather close together; D^2 transverse, slightly concave, D^3 oblique, lower angle of cell little produced.

♂. Tenth tergite and sternite simple, of the same type as in *Macroglossum*. Clasper without friction-scales; harpe vestigial. Penis-sheath with a horizontal, apical, pointed process, directed dextro-laterad.

Larva: head small, not granulose, but hairy; a pale dorso-lateral line, and another ventro-lateral, at least in early stages, with these are connected oblique bands running in the same direction as in *Pholus*, dorso-frontal—ventro-distal; horn short, or in later stages vestigial.

Chrysalis slender, glossy; two frontal tubercles; mesonotum with transverse, mesially interrupted ridge; abdominal segments with large punctures at base, last segments punctured nearly all over; cremaster long, slender, ending in two points.

Hab. Palaearctic and Nearctic Regions.

Five species.

Since the genus as conceived by us contains material closely related *inter se* in pattern and structure, and is sharply defined, we do not see the necessity of dividing the few species into several genera. On the contrary, we think it highly opportune to keep the five species under one generic head and thus impress upon the student the facts (1) that we have here, as in the case of *Haemorrhagia*, a development common to the Northern temperate regions (except the eastern parts of the Palaearctic Regions, where as yet no representative has been found), and (2) that the bombiform *flavofasciata* is a derivation from a *gaurae*-like insect, owing its similarity with *Haemorrhagia* to mimicking the same model.

If one separates the Palaearctic *proserpina* from the Nearctic forms, it becomes necessary to further divide these, and there would then be even justification for keeping each single species in a genus of its own. In this case a generic term will have to be invented for *juanita*, which differs essentially from *gaurae* in the larval state. Everybody may please himself in this matter, but we state with

emphasis that in our opinion the true position of the five species in question will be far better understood if kept together, than if distributed over at least four genera. To serve the understanding of the true relationship, to show the true connection between the species, is the ideal object of classification of animated nature, as opposed to mere baptism of the different forms and groups of forms.

Key to the species :

a.	Breast and legs black	554. *P. flavofasciata.*
	Breast and legs not black	*b.*
b.	Distal margin of forewing deeply sinuate below apex, trilobate at R^3, M^1 and SM^2	552. *P. proserpina.*
	Distal margin of forewing very faintly or not all concave below apex	*c.*
c.	Underside of abdomen, basal area of hindwing below, and marginal band of hindwing above, cinnamon-rufous. .	550. *P. gaurae.*
	Marginal band of hindwing black, underside of abdomen and base of hindwing below olive-green or greyish green . . .	*d.*
d.	Basal area of forewing below ferruginous-orange	551. *P. juanita.*
	Basal area of forewing with the orange colour absent or vestigial . . .	553. *P. clarkiae.*

550. Proserpinus gaurae.

Sphinx gaurae Abbot & Smith, *Ins. Georgia* i. p. 61. t. 31 (*l.*, *p.*, *i.*) (1797) ; Dunc, in Jard., *Natural. Libr.* xxxvii. p. 103. t. 6. f. 3 (*l.*) (1843).

Proserpinus gaurae, Hübner, *Verz. bek. Schm.* p. 132. n. 1414 (1822) ; Clem, *Journ. Ac. Nat. Sci. Philad.* iv. p. 133. n. 9 (1859) (partim) ; id., in Morris, *Syn. Lep. N. Am.* p. 153. n. 1 (1862) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 151. 177 (1865) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 20 (1874) (Georgia) ; id., *l.c.* ii. p. 225. n. 19 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 536. n. 3 (1877) (Georgia ; ? Texas) ; Grote, *l.c.* iii. p. 221. n. 21 (1877) (= ? *juanita*) ; Dimm. & Mann, *Psyche* ii. p. 66 (1877).

Setia gaurae, Oken, *Lehrb. Naturg.* iii. 1. p. 750. sub n. 4 (1815).

Pterogon gaurae, Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 306 (1839) ; Kirby, *Cat. Lep. Het.* i. p. 639. n. 3 (1892) (partim) ; id., in Allen, *Nat. Libr., Moths* ii. t. 97. f. 3 (*i*). 4 (*l.*) (1897).

Thyreus gaurae, Walker, *List Lep. Ins. B. M.* viii. p. 100. n. 3 (1856).

Pogocolon gaurae, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 315. n. 1 (1875) (Georgia) ; Edw., *Bull U. St. Nat. Mus.* xxxv. p. 38 (1889) (liter. rel. to metam.).

Proserpinus circae Edwards, *Papilio* ii. p. 9 (1882) (Georgia ; coll. Neumoegen).

Pogocolon circeae (!), Grote, *Canad. Ent.* xviii. p. 131. n. 22 (1886).

Lepisesia gaurae, id., *l.c.* xviii. p. 131. p. 23 (1886) (partim) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 115 (1888) (partim).

Lepisesia circeae (!), Grote, *Hawk Moths N. Am.* p. 51 (1886) ; Smith, *l.c.* xv. p. 114 (1888).

Lepisesia circae, Ottolengui, *Ent. News* vi p. 218 (1895) (♂ in coll. Neumoegen).

♂ ♀. Palpus longer than in the other species, somewhat projecting.——Forewing distinctly sinuate before hinder angle, sometimes with faint indications of teeth at the middle veins.——Hindwing orange, washed with ferruginous, especially at base ; marginal band reddish cinnamon-rufous ; fringe white, with the short scales black.——Forewing below without black stigma ; basal areas of both wings chestnut, but that of forewing more or less ferruginous in and behind cell ; a triangular apical costal patch including a white oblique apical line cinnamon-rufous. Abdomen beneath also this colour, with pale edges to the segments.

♂. Sexual organs not essentially different from those of *clarkiae*, only the tooth of the penis-sheath is shorter and the harpe less distinct.

Larva green, beautifully marked with red ; a dorso-lateral, interrupted, broad line, oblique side-bands (dorso-frontal—ventro-distal), a series of ventro-lateral elongate spots, a ventral mesial series of minute spots and the abdominal legs, red ; a dorsal mesial row of dots and another above the red lateral markings, black ; horn black, pointed.—Food-plant : *Gaura biennis*.

Hab. Southern part of Atlantic district of Nearctic Region : Georgia to Texas.

Edwards, considering the following species to be the true *gaurae*, described a specimen of the present species as *circae*.

In the Tring Museum 3 larvae, 3 pupae, 3 ♂♂, 2 ♀♀ from Texas.

551. Proserpinus juanita.

Proserpinus gaurae, Clemens (*non* Abbot & Smith, 1797), *Journ. Ac. N. Sc. Philad.* iv. p. 133. n. 9 (1859) (partim ; Texas, iv., vii.) ; Morris, *Cat. Lep. N. Am.* p. 18 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 153. n. 1 (1862) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 151. 177 (1865) (Clem.'s *gaurae* not that of Abb. & Smith ?) ; Grote, *Bull. Buffalo N. Sc.* iii. p. 221. n. 21 (1877).

Pterogon juanita Strecker, *Lep. Rhop. Het.* p. 112. f. 13. f. 6 (♂) (1877) (Rio Grande) ; Kirby, *Cat. Lep. Het.* i. p. 640. n. 4 (1892).

Proserpinus juanita, Butler, *Trans. Zool. Soc. Lond.* ix. p. 636 (1877).

Lepisesia gaurae var. *juanita*, Grote, *Canad. Ent.* xviii. p. 131. sub n. 23 (1886) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 114 (1888) (two broods).

♂♀. Differs from *gaurae* in the forewing being purer olivaceous green, in the hindwing being brighter orange and having a sharply marked black band ; in the basal area of the forewing below being for the greater part ferruginous-orange, while the basal area of the hindwing is olive-green; in the pale olive-green (not chestnut or cinnamon-rufous) underside of the abdomen, which is blackish at the base ; and in the forewing being marked below with a black stigma and having no cinnamon-rufous costal apical patch.

♂. Sexual armature as in *gaurae*, but the tooth of the penis-sheath as long as in *clarkiae*.

Larva red ; two whitish lateral lines, one above, the other below, the upper crossed by oblique dorsal bands which encircle a large dorsal area on each segment ; the dorso-lateral line and oblique markings vestigial on eleventh segment ; stigmata black ; horn obliterated as in *proserpina* and *flavofasciata*.—Food-plant : *Gaura*.

Hab. Texas ; Colorado ; Arizona.

Two subspecies :

a. P. juanita juanita.

Pterogon juanita, Strecker, *l.c.*

Hab. Texas and Colorado.

In the Tring Museum 4 larvae, 3 pupae, 15 ♂♂, 20 ♀♀ from : Texas, iii. iv. ; Colorado, Arbotes, 15. vi. The Colorado is ♂ a transition to the following subspecies.

b. P. juanita oslari subsp. nov.

♂♀. The green as well as the orange areas obviously paler than in the preceding ; the stigma of the forewing smaller above and quite indistinct below ; fringe of forewing above more distinctly dotted.

Hab. Verde R., Arizona, June 1902 (Oslar).

In the Tring Museum 7 ♂♂, 3 ♀♀ ; *type* : ♂.

552. Proserpinus proserpina.

Ernst & Engr., *Pap. Eur.* ii. t. 121. f. 161 a–i (1782).
Sphynx (!) *proserpina* Pallas, *Spic. Zool.* ix. p. 26. t. 2. f. 7 (1772) (Germania).
Sphinx oenotherae Denis & Schiff., *Syst. Verz. Schm. Wien* p. 43. n. 1. p. 239. fig. frontisp. (1776).

♂♀. Palpus shorter than in *gaurae*; end-segment of antenna and hindtarsus also shorter, while the thorn at the end of the foretibia is longer; distal margin of forewing far less oblique, irregularly trilobate at R^3, M^1, and SM^2. In these characters, *proserpina* is more specialised than the American species.——Hindwing paler yellow than in *clarkiae*.

♂. Tenth segment as in *clarkiae* (Pl. XLV. f. 4), sternite rather longer and slenderer. Harpe short, often dilated at end (Pl. 1L. f. 20), sometimes as gradually narrowed to a point as in *gaurae*.

Larva green or brown, paler below than above; stigmata in brown oblique patches; pale dorso-lateral line more or less vestigial; back dotted with brown; horn represented by a smooth prominence encircled with black.—Food-plants: *Oenothera; Epilobium; Lythrum.*

Hab. Central and South Europe, eastward to Buchara.

Two subspecies:

a. P. proserpina proserpina.

Sphinx proserpina Pallas, *l.c.*
Sphinx oenotherae Denis & Schiff., *l.c.*; Fuessly, *Mag. Ent.* ii. 1. p. 65. t. 1. f. 9. 10 (1779); Esp., *Schmett.* ii. p. 167. t. 20. p. 198. t. 26. f. 2. 3 (1779); Goeze, *Ent. Beytr.* iii. 2. p. 212. n. 29 (1780); Fabr., *Spec. Ins.* ii. p. 141. n. 10 (1781) (=*proserpina*); Fuessly, *N. Mag. Ent.* ii. p. 210 (1784); id., *l.c.* iii. p. 146 (1786); Fabr. *Mant. Ins.* ii. p. 93. n. 11 (1787); Borkh., *Eur. Schmett.* ii. p. 59. 135. 177 (1788); Lang, *Verz. Augsb.* ii. p. 71. n. 572. 573 (1789); Gmel., *Syst. Nat.* i. 5. p. 2374. n. 54 (1790); Rossi, *Fauna Etr.* ii. p. 15. n. 362 (1790); Schwarz, *Raupenkal.* p. 364 (1791); Brahm, *Insectenkalend.* ii. 1. p. 422. n. 297 (1791); Fabr., *Ent. Syst.* iii. 1. p. 359. n. 12 (1793); Schrank, *Fauna Boica* ii. 1. p. 229. n. 1393 (1801); Hübn., *Eur. Schmett., Sphing.* f. 58 (180–?); id., *Gesch. Schmett.* ii. *Sphing.* iii. (180–?); Ochs., *Schmett. Eur.* ii. p. 196. n. 5. (1808); Nagel, *Hülfsb. Schm.* p. 148 (1818); Latr., in *Nour. Dict. d'Hist. Nat.* xxxii. p. 27 (1819); God., *Lép. France* iii. p. 52. t. 19. f. 2 (1823); Luc., *Lép. Eur.* p. 109. t. 44 (1834).
Sphinx schiffermilleri Fuessly, *Mag. Ent.* ii. p. 69 (1779) (=*oenotherae*).
Sesia oenotherae, Fabricius, in Illig., *Mag. Ent.* vi. p. 88. n. 44 (1807).
Sphinx oenotherae (!), Latreille, *Gen. Ins. Crust.* iv. p. 210 (1809).
Setia oenotherae, Oken, *Lehrb. Naturg.* iii. 1. p. 750. n. 4 (1815).
Macroglossa oenotherae, Ochsenheimer, *Schm. Eur.* iv. p. 42 (1816); Friv., in Silberm., *Rev. Ent.* ii. p. 181 (1834) (Hungary); Eversm., *Fauna Volgo-Ural.* p. 107 (1844) (vi.); Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847); Standf., *ibid.* v. p. 15 (1851) (larva).
Proserpinus oenotherae, Hübner, *Verz. bek. Schm.* p. 132. n. 1413 (1822); Walk., *List Lep. Ins. B. M.* viii. p. 97. n. 1 (1856) (S. France); Butl., *Trans. Zool. Soc. Lond.* ix. p. 535. n. 1 (1892).
Sphynx (!) *oenotherae*, Vogel, *Schm. Cabin.* iv. p. 21. t. 7. f. 4. a. b (1823).
Pterogon oenotherae, Boisduval, *Ind. Meth.* p. 32 (1829) (Gall. m., vi.); id., *Coll. Icon. Chen.* t. 18. f. 1 (1832); Caut., in Silberm., *Rev. Ent.* i. p. 76 (1833) (Dept. Var); Boisd., *Spec. Gén.* i. t. 15. f. 3 (1836); Thon, *Nat. Schm.* p. 103. t. 52. f. 719—721 (1837); Luc., in Chenu, *Enc. Hist. Nat., Pap.* i. p. 255. f. 452 (1853); Ménétr., *Enum. Corp. Anim. Mus. Petr., Lep. Suppl.* ii. p. 95. n. 1575 (1857); Wilde, *Raup.* ii. p. 80. t. 1. f. 9 (1860); Staud. & Wocke, *Cat. Lep.* p. 16. n. 30 (1861); Boisd., *Spec. Gén. Lép. Hét.* i. p. 312. n. 1 (1875); Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 256. t. 7. f. 63. 64. 65 (1882) (larva); Schütze, *Iris* ix. p. 323. n. 14 (1896) (Oberlausitz).
Pterogon oenotherae (!), Blanchard, *Hist. Nat. Ins.* iii. p. 478. t. 20. f. 2 (1840).
Sphinx aethereae (!), Lalanne, *Man. Ent.* p. 122. n. 2 (date?).
Pterogon proserpina, Staudinger & Wocke, *Cat. Lep.* ed. ii. p. 38. n. 491 (1871); Weil., *Progr. Oberrealsch. Innsbr.* p. 15 (1880); Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 46 (1880); Rom., *Mém. Lép.* i. p. 72 (1884) (Borjoum, vi. vii.); Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 12 (1889);

Kirby, *Cat. Lep. Het.* i. p. 639. n. 1 (1892); Hofm., *Raup. Grossschm.* p. 31. t. 8. f. 8. a. b. (1893); id., *Grossschm.* p. 31. t. 18. f. 7 (1894) (v. vi.); Kill. & Cafl., *Jahrb. Nat. Ges. Graub.* xxxviii. *Jpp.* p. 20 (1895); Bartel, in Rühl, *Grossschm.* ii. p. 204 (1900); Staud. & Reb., *Cat. Lep.* ed. iii. p. 104. n. 765 (1901).

**Proserpinus oenotheroides*, Butler, *Proc. Zool. Soc. Lond.* p. 621 (1875) ("Brazil," crr. loc.;—Mus. Brit.).

Pterogon oenotheroides, Kirby, *Cat. Lep. Het.* i. p. 639. n. 2 (1892) (Brazil ?).

♂ ♀. Length of forewing 17—23 mm. There is little variation observed.

Hab. Central Germany southward to Portugal and Spain, Sicily, eastwards to Caucasia.

In the Tring Museum 3 larvae and 36 specimens.

b. P. proserpina japetus.

**Pterogon proserpina* var. *japetus* Grum-Grsch., in Rom., *Mém. Lép.* iv. p. 513. n. 209 (1899) (Kabadian, v.;—Mus. Tring); Kirby, *Cat. Lep. Het.* i. p. 639. sub n. 1 (1892); Bartel, in Rühl, *Grossschm.* ii. p. 208 (1900); Staud. & Reb., *Cat. Lep.* ed. iii. p. 104. sub n. 765 (1901) (Buch. or.; Ferg. m.).

♀. Forewing measuring 25 mm. On the whole paler than European specimens, the marginal band of the hindwing below narrower.

Hab. Bokhara: Kabadian; Turkestan: Ferghana.

In the Tring Museum 1 ♀ (*type*) from Kabadian, ex coll. Grum-Grschimaïlo.

553. **Proserpinus clarkiae.**

**Pterogon clarkiae* Boisduval, *Ann. Soc. Ent. France* p. 318. n. 84 (1852) (Calif.;—coll. Charles Oberthür); id., *Ann. Soc. Ent. Belg.* xii. p. 26. n. 85 (1869); Streck., *Lep. Rhop. Het.* p. 111. t. 13. f. 5 (♀) (1877) (Oregon; Northern Calif.); Maass., *Stett. Ent. Zeit.* xli. p. 51 (1880) (=*victoria*); Butl., *Papilio* i. p. 103 (1881); Rivers, *Papilio* iii. p 65 (1883) (March, April, at flowers of wild turnip).

Thyreus (?) *clarkiae*, Walker, *List Lep. Ins. B. M.* viii. p. 262 (1856).

Proserpinus clarkiae, Clemens, *Journ. Ac. N. Sc. Philad.* iv. p. 134. n. 10 (1859) (Calif.); Morris, *Cat. Lep. N. Am.* p. 18 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 154. n. 2 (1862); Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 151. n. 15 (1865); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 20 (1874); id., *l.c.* ii. p. 225. n. 18 (1875); Edw., *Proc. Calif. Ac. Sc.* vi. p. 89 (1876) (May, June; =*victoriae*); Butl., *Trans. Zool. Soc. Lond.* ix. p. 536. n. 2 (1877) (Calif.); Grote, *l.c.* iii. p. 221. n. 20 (1877) (=*victoria*).

Lepisesia victoria Grote, *Bull. Buffalo Soc. N. Sc.* ii. p. 147 (1874) (Brit. Colomb.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 517. n. 2 (1877).

Pogocolon clarkiae, Boisduval, *Spec. Gén. Lép. Hét.* i. p 316. n. 2 (1875).

Dicneces clarkiae, Butler, *Ann. Mag. N. H.* (5). viii. p. 308 (1881); Kirby, *Cat. Lep. Het.* i. p. 635. n. 1 (1892).

Lepisesia clarkiae, Grote, *Canad. Ent.* xviii. p. 131. n. 21 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 112 (1888) (N. Calif.; Iowa; Oregon).

Pterogon clarkei (!), Smith, *l.c.* xv. p. 241. t. 4. f. 3 (tenth tergite). 4 (foretib.) (1888).

♂ ♀. Palpus short, obtuse. Wings in colour and shape like those of *gaurae*, but less elongate, hindwing especially less acuminate, with the outer margin convex and the anal angle not projecting. Spines of foretibia comparatively stouter than in *gaurae* and *juanita* (the figure given of the foretibia by Smith, *l.c.*, is not correct, the row of spines not being widely interrupted, and further, the apical process not being a spine as represented, but a prolongation of the tibia). Hindwing paler yellow than in *juanita*, almost agreeing in colour with that of *proserpina*.

♂. Tenth segment (Pl. XLV. f. 4) essentially the same as in the other species; sternite much shorter and broader than the tergite, obtusely boat-shaped. Harpe (Pl. IL. f. 19) without free process, but notched just before end. Penis-sheath as in *flavofasciata*.

Early stages not known. Larva said by Boisduval to feed on *Clarkia*.

Hab. Pacific district : California ; Oregon ; British Columbia. "Iowa" according to Smith : error !

In the Tring Museum 22 ♂♂, 1 ♀ from : Ozoyoos, Brit. Col. (Reynolds) : Almots, Washington ; Gold Hill, Oregon (Biedermann) ; California ; Berkeley, California.

554. Proserpinus flavofasciata.

**Macroglossa flavofasciata* Walker, *List Lep. Ins. B. M.* viii. p. 87. n. 3 (1856) (Hudson's B. Territ.;—Mus. Brit.).

♂♀. Palpus short, obtuse. Upperside of head and thorax and end of abdomen (except middle) straw-yellow, rest of body deep black, edge of pronotum and sides of metanotum also more or less extended black. Distal margin of forewing slightly sinuate behind ; a black submedian band corresponding to the band of *gaurae*, followed by a pale band ; the scaling of this pale band is dispersed and most of the scales are grey ; hindwing with a yellow discal band, which is seldom vestigial only.

♂. Tenth segment as in the other species ; tergite slender, faintly spatulate ; sternite much shorter, more than twice as broad, boat-shaped, obtuse, gradually curved upwards at end in side-view. Harpe (Pl. IL. f. 18) represented by a straight tapering ridge which is not detached from the clasper. Penis-sheath (Pl LIV. f. 16) with a prominent, horizontal, feebly curved, pointed process.

Early stages not fully known, larva of *flav. rachel* noticed by Bruce ; see below.

Hab. Nearctic Region, from Hudson's Bay to Vancouver, southward to Colorado.

Three subspecies. The characters by which the three "species" have been differentiated by the respective authors are not so constant as they have been represented to be. A rare insect, of which we have not seen many specimens.

a. P. flavofasciata flavofasciata.

**Macroglossa flavofasciata* Walker, *l.c.* (1856) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 131. n. 4 (1859) (Albany R, Huds. Bay) ; Morris, *Cat. Lep. N. Am.* p. 17 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 151. n. 1 (1862) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 364. n. 51 (1875) ; Streck., *Lep. Rhop. Het.* p. 110. t. 13. f. 4 (♀) (1877) (Canada ; Holyoke, Mass.).

Lepisesia flavofasciata, Grote, *Proc. Ent. Soc. Philad.* v. p. 39 (1865) (Canada) ; id. & Rob., *ibid.* v. p. 149. n. 1 (1865) ; Beth., *Canad. Ent.* i. p. 10. n. 7 (1869) ; Grote, *Bull Buffalo Soc. N. Sc.* i. p. 17 (1874) (Canada) : id., *l.c.* ii. p. 225. n. 17 (1875) ; id., *l.c.* iii. p. 221. n. 19 (1877) (Canada) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 517 n. 1 (1877) ; Fish., *Canad. Ent.* x. p. 140 (1878) (Maine, one specim. May 28th) ; Fern., *ibid.* xvi. p. 21 (1884) (Orono, Maine) ; id., *Sphing. N. Engl.* p. 19. n. 6 (1886) (Maine ; June, midday) ; Grote, *Hawk Moths N. Am.* p. 27 (1886) (Can. ; East. States ; Northern N. York, iv. v.) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 111 (1888) (Hudson's Bay Territ. ; Canada ; Maine ; Mass.) ; Lym., *Canad. Ent.* xxiii. p. 8 (1891) (Ormstown, Chateauguay Co., Albany R., Hudson's Bay territory ; Strecker's fig. too pale yellow) ; Kirby, *Cat. Lep. Het.* i. p. 628. n. 1 (1892) ; Hanh., *Canad. Ent.* xxxi. p. 50 (1899) (Manitoba, ! specim., v.).

♂♀. Yellow band of hindwing reaching to abdominal margin.

Hab. Eastern Canada and New England.

In the British Museum 1 ♂.

b. P. flavofasciata ulalume.

Macroglossa ulalume Strecker, *Lep. Rhop. Het.* p. 135. t. 15. f. 3 (♀) (1878) (Oregon).

Lepisesia ulalume, Smith, *Trans. Amer. Ent. Soc.* xv. p. 111 (1888) ; Edw., *Ent. Amer.* iii. p. 223 (1888) ; Kirby, *Cat. Lep. Het.* i. p. 628. n. 2 (1892) , Gibs., *Canad. Ent.* xxxi. p. 370 (1899)

(N. Westminster and Enderby, Brit. Col.) : Jones, *Rept. Ent. Soc. Ontario* xxx. p. 58 (1900) Westminster, Brit. Col.).

♂ ♀. Yellow band of hindwing triangular, narrowing behind, not reaching abdominal margin, or (typical *ulalume*) hindwing above black, with a vestige of a greyish band. Basal area of forewing below black or shaded with orange. Palpus black or somewhat greyish beneath.

Hab. Oregon ; British Columbia.

In the Tring Museum 4 ♂♂, 1 ♀ from : Westminster, Brit. Col. ; Keith Road, N. Vancouver, 14. v. 1902 (N. C. Rothschild).

These five specimens have a yellowish band on the upperside of the forewing. Another ♀, also from the Keith Road, has a trace of a greyish band. This specimen has kindly been presented to the Tring Museum by Mr. Wilson, who says that he has kept it, together with some other Lepidoptera, in memory of his little daughter Rose Annette, to whom he had given it shortly before her death. We gratefully acknowledge the gift.

The obvious differences between the specimen of Rose Annette Wilson and that caught by N. C. Rothschild render it probable that the distinctions between *flavofasciata*, *ulalume* and *rachel*, are merely individual, not subspecific.

c. P. flavofasciata rachel.

Lepisesia ulalume var. *rachel* Bruce, *Ent. News* xii. p. 19 (1901) (Colorado ; larva on *Epilobium*).

One specimen known : sex not stated. It is said to differ from *ulalume* in the band of the wings being "lighter in colour, wider and more distinct," and in the collar and thorax not being black. The author attributes, however, an intense black collar and thorax to *ulalume*, in which he is wrong. Judging from the short description, *rachel* seems to stand intermediate between *fl. flavofasciata* and *fl. ulalume*.

Mr. Bruce says : "I was collecting larvae of *Alypia lorquini* on *Epilobium* and found a large Sphinx larva looking very much like that of *T. abboti*. The anal horn was absent, and a shining button was in its place. I fed it carefully and it pulled a leaf or two over itself on the soil and pupated, and appeared as a moth in February. The specimen is therefore from Colorado, and is now in the collection of the Academy of Natural Sciences of Philadelphia."

CXLVIII. EUPROSERPINUS.—Typus : *phaeton*.

Euproserpinus Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 177 (1865) (type : *phaeton*).
Macroglossa, Boisduval (*non* Ochsenheimer, 1816), *Ann. Soc. Ent. Belg.* xii. p. 65 (1868).
Lepisesia, Smith (*non* Grote, 1865), *Trans. Amer. Ent. Soc.* xv. p. 112 (1888).

♂ ♀. Differs from *Proserpinus* in the more abrupt hook of the antenna, the last three or four segments being quite suddenly reduced in width, and in the pulvillus and paronychium being *absent*. Sexual armature of ♂ similar to that of *Proserpinus clarkiae*, tooth of penis-sheath shorter.

Early stages not known.

Hab. Pacific District of Nearctic Region.

Two species, which are easily distingnished from *Proserpinus* by the white hindwing and the white underside of breast and wings.

Abdomen with creamy white side-tufts . . .	555. *E. phaeton*.
Abdomen without creamy white side-tufts . .	556. *E. euterpe*.

555. Euproserpinus phaeton.

Euproserpinus phaeton Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 151. 178 (1865) (Calif., from figure) ; iid., *Trans. Amer. Ent. Soc.* ii. p. 181 (1869) (Calif.) ; Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 19 (1874) ; id., *l.c.* ii. p. 225. n. 15 (1875) (*erato*) ; Edw., *Proc. Calif. Ac. Sc.* vi. p. 89 (1875) (Los Angeles) ; Grote, *Canad. Ent.* viii. p. 28 (1876) ; id., *Bull. Buffalo Soc. N. Sc.* i. p. 221. n. 17 (1877) ; id., *Canad. Ent.* xi. p. 94 (1878) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 536 (1877) ; Grote, *l.c.* xviii. p. 131. n. 17 (1886) ; Edw., *Ent. Amer.* iv. p. 25 (1888) (sexes confounded) ; Kirby, *Cat. Lep. Het.* i. p. 635. n. 1 (1892).

**Macroglossa erato* Boisduval, *Ann. Soc. Ent. Belg.* xii. p. 65 (1868) (Los Angeles ;—coll. Charles Oberthür) ; Butl., *l.c.* ix. p. 529. n. 41 (1877) ; Streck., *Lep. Rhop. Het.* p. 125. t. 14. f. 1 (1878) (Los Angeles).

Macroglossa phaeton, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 362. n. 49 (1875) (= *erato*).

Macroglossum phaeton Grote, *Trans. Amer. Ent. Soc.* iii. p. 174 (1870).

Lepisesia phaeton (!), Smith, *ibid.* xv. p. 112 (1888).

♂♀. Black band of hindwing quite straight, tapering behind, veins R^3, M^1 and M^2 with some black scales.

Hab. South California.

In the Tring Museum 1 ♂, 2 ♀♀ from : Los Angeles, March ; San Diego : Plumas Co., March.

556. Euproserpinus euterpe.

Euproserpinus euterpe Edwards, *Ent. Amer.* iv. p. 25 (1888) (San Diego, Calif.) : Smith, *Trans. Amer. Ent. Soc.* xv. p. 235 (1888) ; Kirby, *Cat. Lep. Het.* i. p. 635. n. 2 (1892) ; Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (1 ♂, *type*, ex coll. Hy. Edwards).

♂. Abdomen without pale side-tufts. Scaling of antenna white. Marginal band of hindwing convex in middle.

The tibial armature is essentially the same as in *phaeton* ; we received a drawing of the forelegs through the kindness of Mr. Beutenmüller. The antennae are said by Edwards to be of equal size throughout, not clubbed as in *phaeton* : is this statement correct?

Hab. South California.

CXLIX. ATEMNORA gen. nov.—Typus : *westermanni*.

Macroglossa Boisduval (*non* Ochsenheimer, 1816), *Spec. Gén. Lép. Hét.* i. p. 332 (1875) (partim).

Aellopus, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 634 (1892) (partim).

♂♀. Genal process very large, almost reaching to the tip of the pilifer. Palpus projecting, pointed. Head with slight mesial crest. Eye-lashes short. Antenna slender, feebly incrassate distally in ♀, hook sharply curved, end-segment long, filiform, rough-scaled. Abdomen broad, flattened, resembling that of *Hypaedalia*, seventh (♀) resp. eighth (♂) segment much narrower than preceding ; anal tuft truncate, the scales diverging at end in ♀; spines strong as in *Macroglossum*, above and below, but the proximal spines of each segment longer than broad (Pl. LXII. f. 10). Merum of midcoxa produced backwards into a sharp process. Tibiae unarmed ; spurs unequal, long terminal one half the length of the first tarsal segment ; midtarsal comb extending from near base to near middle of first segment ; paronychium with two pairs of lobes ; posterior tarsus somewhat compressed, the two external rows of spines closely together, with an additional row in between, so that the lower part of the outer surface is nearly as densely spinose as in *Macroglossum*.

♂. Tenth abdominal segment of the same type as in *Macroglossum* and in *Temnora funebris*, *scitula*, etc. ; the tergite and sternite of nearly the same length, the sternite the broader, acuminate, slightly curved, long, boat-shaped. Clasper with four large truncate friction-scales over a groove ; harpe (Pl. IL. f. 34) ending in a short and narrow process. Penis-sheath (Pl. LVI. f. 14) armed in a similar way as in some species of *Temnora*, there being a left, semi-detached, densely dentate process or ridge, and a free right process which is pointed and bears few teeth ; within the sheath there is a dense bundle of *very* long spines, homologous to the spines found in *Temnora*.

Early stages not known.

Hab. Aethiopian Region.

One species.

A connecting link between *Temnora* and *Macroglossum*, agreeing with the latter in many respects, but differing markedly in the spines of the abdomen, the anal tuft, the hindtarsus, etc.

557. Atemnora westermanni.

**Macroglossa westermanni* Boisduval, *l.c.* p. 355. n. 38 (1875) (Guinea ;—coll. Charles Oberthür).
**Macroglossa falkensteini* Dewitz, *Mitth. Münch. Ent. Ver.* iii. p. 23. t. 1. f. 1 (1879) (Chinchoxo ;—Mus. Berlin) ; Holl., *Trans. Amer. Ent. Soc.* xvi. p. 56. n. 2 (1889) (Kangwé) ; Kirby, *Cat. Lep. Het.* i. p. 633. n. 63 (1892) ; Schaus & Clem., *Sierra Leone Lep.* p. 17 (1893).
Aellopus westermanni, Kirby, *l.c.* p. 635. n. 6 (1892).

♂ ♀. A widely distributed species, which does not seem to vary geographically. It is easily recognised by its *Macroglossum*-like appearance, especially by the pointed palpus, the yellow-spotted abdomen and the strong abdominal spines.

Hab. Sierra Leone to Angola, eastwards to the coast of German East Africa ; Madagascar ; probably all over the Aethiopian Region, except the southern parts of Cape Colony.

In the Tring Museum 22 ♂♂, 9 ♀♀ from : Sierra Leone, viii. ; Gold Coast ; Cameroons ; Bopoto and Yakusu, Congo, viii (K. Smith) ; Angola, iv. ; Baie d'Antongil, Madagascar, iii. iv. (Mocquerys).

CL. MACROGLOSSUM.—Typus : *stellatarum*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Sesia Fabricius, *Syst. Ent.* p. 547 (1775) (partim ; type : *tantalus*).
Macroglossum Scopoli, *Intr. Hist. Nat.* p. 414 (1777) (type : *stellatarum*).
Macroglossa Oebsenheimer, *Schm. Eur.* iv. p. 41 (1816) (partim ; includes *stellatarum*).
Hemaris Dalman, *Kongl. Vet. Ak. Handl.* p. 207 (1816) (partim ; includes *stellatarum*).
Macrogossum (!), Latreille, in *Nouv. Dict. Hist. Nat.* xxxi. p. 105 (1819).
Psithyros Hübner, *Verz. bek. Schm.* p. 131 (1822) (partim ; type : *stellatarum*).
Rhamphoschisma Wallengren, *Oefv. Vet. Ak. Förh.* xv. p. 139 (1858) (type : *trochilus*).
Bombylia Kirby, *Cat. Lep. Het.* i. p. 629 (1892) (sub syn. ; type : *stellatarum*).

♂ ♀. Genal process very large, triangular. Tongue long. Eye lashed. Palpus broad, pointed, projecting, end-surface triangular. Head feebly crested. Antenna clubbed, hook short and rather abrupt, variable in length ; end-segment slender, different in length in the various species. Spines of abdomen flat, very strong, those of first row broader than long (Pl. LXII. f. 11), excepting proximal segments, where they are longer than broad ; plate of sternite of seventh segment triangular in ♀, *without* spines ; fan-tail large in both sexes, previous

segments with lateral tufts. Merum of midcoxa produced backwards into a sharp tooth ; upperside of mid- and hindtibia and underside of hindtibia at apex with long scaling ; shorter midtibial spur on innerside with comb of more or less heavy spines ; midtarsal comb present, but the spines not long ; spurs of hindtibia very unequal ; paronychium with two pairs of lobes, pulvillus present ; first segment of hindtarsus somewhat compressed, with additional spines on outer surface. Distal edges of wings entire ; SC^2 and R^1 of hindwing from upper angle of cell, R^2 central, R^3 and M^1 rather close together but always separate.

Larva tapering in front, head rather small, horn long in first stages, shorter later on ; ground-colour green or brown, sometimes nearly black, pale dots more or less obvious : a dark dorsal line, and two pale lateral lines, one subdorsal, the other subventral, these lines often disappearing, except the subdorsal ; horn granulose.— Food-plants : *Rubiaceae* ; *Galium* ; *Paederia* ; *Morinda* ; etc.

Pupa with compressed tongue-case, which is carinate ventrally ; cremaster variable, conical, slender, smooth, or flattened, broad, bifid, dentate at the edges (very few pupae known) (Pl. LXIV. f. 20. 21. 22).

Hab. Old World.

59 species : 1 Palaearctic, 1 African, 5 Malagassic, 52 Oriental.

As these species are partly very difficult to distinguish we give three keys, and hope that these, together with the descriptions and the plates, will enable the reader to name the species. *Macroglossum* is one of those genera of which the material contained in collections is nowhere correctly separated into species. The literature on these insects, excepting a few easily recognised forms, is of little value, as one does not know with certainty which species the respective author meant to designate by a certain name. This is unfortunate in respect to the larvae, for very few have been figured, and we are not sure in every case to which species the larva belongs.

I. Key to the species, referring to colour :—

a. Hindwing below white at base like breast ; or yellowish white, but in this case there is no yellow band on the upperside	*b*.
Hindwing below reddish tawny, or yellow at base, or with a yellow patch before abdominal margin	*c*.
Hindwing below mummy-brown, with a trace of yellow at the base	613. *M. phocinum* (Pl. III. f. 1).
b. Abdomen without yellow side-patches	*c*.
Abdomen with yellow side-patches . . .	*d*.
c. Hindwing above in middle and abdomen glossy whitish blue .	616. *M. splendens*.
Hindwing above yellow before abdominal margin ; abdomen with white lateral spots on segments 3 and 4 . . .	615. *M. micacea*.
Hindwing above neither whitish blue in middle nor yellow before abdominal margin . .	614. *M. buruensis* (Pl. IV. f. 4).

d. Hindwing with yellow band above, often interrupted; breast greyish white . . . . . 565. *M. bombylans*.
Hindwing without yellow band above; breast yellowish white . 566. *M. avicula*.
e. Costal margin of hindwing dilated into an antemedian lobe . . 602. *M. aquila*.
Costal margin of hindwing simple . . . *f*.
f. A band from middle of costal margin of forewing to hinder angle. . . . . *g*.
No such band. . . . . *h*.
g. No distinct antemedian and discal lines . . . . . 608. *M. hemichroma*.
These lines distinct . . . 607. *M. tinnunculus*.
h. Forewing above with two sharply defined creamy bands, one median, one postdiscal . . . . 589. *M. dohertyi*.
No such bands . . . . . *i*.
i. Antemedian band of forewing above strongly oblique, with a pale proximal border which is straight from costal margin to SM^2. . 597. *M. fritzei* (Pl. III. f. 4).
Antemedian band curved in front, or transverse . . . . . *j*.
j. Interspaces of lines of forewing marked with bluish white scaling 606. *M. multifascia* (Pl. VI. f. 7).
No such white scaling . . . . *k*.
k. Tail and preceding tergite yellow, the latter with black mesial spot . . . . . 604. *M. eichhorni* (Pl. III. f. 14).
Not so; head and thorax with two broad grey stripes contrasting sharply with the greenish olive-black colour of head and thorax 612. *M. mitchelli*.
Not so . . . . . *l*.
l. Basal area of forewing above black or greenish black, sharply limited by the straight antemedian band . . *m*.
Basal area much paler than antemedian band . . . . . *n*.
m. Yellow band of hindwing interrupted 611. *M. meeki* (Pl. IV. f. 2).
Yellow band of hindwing not interrupted; abdomen below brown . 610. *M. faro* (Pl. IV. f. 14).
Yellow band of hindwing not interrupted; abdomen below tawny . 609. *M. passalus*.
n. Hindwing with very narrow tawny-brown border; abdomen with creamy white side-patches. . 558. *M. stellatarum*.

Hindwing without distinctly darker border, entirely chrome-yellow ; abdominal side-patches yellow . 559. *M. alluaudi.*

Hindwing uniformly orange-rufous 560. *M. soror* (Pl. IV. f. 19).

Hindwing tawny, with yellow antemedian band . . . . 561. *M. milvus* (Pl. IV. f. 18).

Hindwing with more or less broad tawny or black border, or nearly entirely black. . . . . . *o.*

o. Hindwing tawny, without yellow band ; or if such a band present, then distal border gradually shading off proximally (Pl. IV. f. 5. 6. 9—13) . . . . . *p.*

Hindwing with sharply defined brownish black distal border, often produced basad in middle ; or the yellow band vestigial . . . *x.*

p. Hindwing tawny (Pl. IV. f. 5. 6. 11 . . *q.*

Hindwing with yellow-tawny band (Pl. IV. f. 9. 10. 12. 13 ; the band too pale in fig. 12) . . . . *s.*

q. Fifth abdominal segment without yellow side-patch . . . . . *r.*

Fifth abdominal segment with yellow side-patch . . . 569. *M. vacillans* (Pl. IV. f. 5).

r. Antemedian band of forewing filled in with black . . . . 567. *M. regulus* (Pl. IV. f. 11).

Antemedian band of forewing not filled in with black . . . 568. *M. gyrans* (Pl. IV. f. 6).

s. Breast more or less mummy-brown, at least laterally . . . . . *t.*

Breast yellowish white . . . 564. *M. trochilus.*

t. Forewing above with a sharply defined grey costal discal area : antemedian band very oblique . 571. *M. particolor* (Pl. IV. f. 13).

Not so . . . . . *u.*

u. Yellow abdominal side-patches separate . . . . . *v.*

Yellow abdominal side-patches confluent . . . . . *w.*

v. Brown postdiscal spot SC^5—R^1 of forewing above very prominent . 573. *M. assimilis.*

Brown postdiscal spot SC^5—R^1 of forewing above not prominent . 572. *M. belis.*

w. Tail below for the greater part tawny, tip pale . . . . 563. *M. pachycerus* (Pl. IV. f. 9).

Tail below brown ; forewing with stigma . . . . . 562. *M. aesalon* (Pl. IV. f. 10).

Tail below greyish brown; forewing without stigma . . . . 570. *M. afflictitia* (Pl. IV. f. 12).

x. Abdomen with four yellow side-patches . . . . . 600. *M. joannisi* (Pl. III. f. 2).

Abdomen with three (or less) side-patches . . . . *y*.

y. Antemedian band of forewing very broad, including cross-veins . 596. *M. godeffroyi*.

Antemedian band of forewing not including cross-veins . . . . . *a'*.

a'. Forewing above: discal lines not distinct; no grey costal subapical area; no grey streak R^1; no subapical brown spot SC^5—R^1; no brown dorsal spots on abdomen . . *b'*.

One or the other of these markings, or all, distinct . . . . . *c'*.

b'. Tail not yellow; yellow band of hindwing interrupted; side-patches of abdomen vestigial; palpus below blackish grey . 599. *M. vidua* (Pl. III. f. 15).

Tail not yellow; yellow band of hindwing not interrupted; side-patches of abdomen reduced; underside of abdomen blackish brown, with whitish grey mesial patches, seventh sternite grey in ♀; yellow area of hindwing below sharply defined, restricted 603. *M. sylvia*.

Abdomen greyish yellow or fawny beneath . . . . . 605. *M. corythus* (Pl. IV. f. 1. 7).

c'. Greyish median area of forewing with distinct stigma . . . 583. *M. stigma* (Pl. IV. f. 15).

No such conspicuous stigma . . . . *d'*.

d'. Forewing above with greyish white median band, interrupted or not (Pl. III. f. 3; Pl. IV. f. 8. 16) . . . *e'*.

No such band . . . . *g'*.

e'. Yellow band of hindwing interrupted 588. *M. albigutta* (Pl. III. f. 3).

Yellow band of hindwing not interrupted . . . . *f'*.

f'. Forewing below without brown distal border . . . . 590. *M. hirundo* and 591. *M. rectans* (Pl. IV. f. 8).

Forewing below with brown distal border . . . . . 587. *M. medioritta* (Pl. IV. f. 16).

g'. Forewing above with a costal apical grey area strongly contrasting with the brown scaling behind

it ; R^1 not grey behind the black subapical spot SC^5—R^1 . . 595. *M. saga.*

No such grey area, or R^1 streaked with grey behind the subapical spot . . . *k'.*

k'. Antemedian band filled in with black in posterior half only : underside of wings blackish mummy-brown . . . . 601. *M. semifasciata.*

Antemedian band not filled in in front : discal lines distinct : underside reddish tawny . . 579. *M. insipida poecilum* (Pl. III. f. 17).

Antemedian band not filled in, or entirely black . . . . . *i'.*

i'. Antemedian band and discal lines more or less merged together . . . *j'.*

Antemedian band and discal lines separated by a more or less greyish interspace . . . . . *m.*

j'. Yellow abdominal area of hindwing below very sharply defined . . . *k'.*

Yellow abdominal area of hindwing below gradually fading away . . . *l'.*

k'. An interrupted greyish outer discal line on forewing above from costal to hinder margin . . . 576. *M. castaneum* (Pl. III. f. 16).

Grey lines all interrupted . . 575. *M. calescens* (Pl. III. f. 5).

l'. Palpus whitish grey . . . 598. *M. glaucoptera.*

Palpus blackish grey . . . 574. *M. fruhstorferi.*

m'. Forewing above with a grey costal subapical patch extending behind R^1 to distal margin ; antemedian band not filled in with brown . 593. *M. nubilum* (Pl. IV. f. 17).

The grey patch not extended beyond R^1 ; this vein with grey streak ; yellow band of hindwing not obviously curved . . . 592. *M. prometheus* (Pl. IV. f. 3).

No grey streak R^1, or yellow band of hindwing incurved . . . . . *n'.*

n'. Grey streak R^1 present ; palpus dirty cinnamon-grey, not greyish white 594. *M. variegatum* (Pl. III. f. 13).

Grey streak R^1 absent, or palpus greyish white . . . . . *o'.*

o'. Antemedian band of forewing filled in with black, its distal edge straight; median interspace grey, band-like; second discal line dilated behind R^1 ; palpus greyish white ; body above olive-brown . . . 584. *M. heliophila* (Pl. III. f. 6).

As before; body blackish brown . 585. *M. melas* (Pl. III. f. 19).
Like *heliophila*, but forewing above, ontside the grey postdiscal one, with a black line which is as broad as the second discal line . 586. *M. divergens*.
Not so . . . . . *p'*.

p'. Disc of forewing below and sternites of abdomen bright tawny, or the latter black with tawny spots . . . . . *q'*.
Underside less bright tawny, more cinnamon . . . . . *r'*.

q'. A small species; harpe of ♂ not divided . . . . . 579. *M. insipida* (Pl. III. f. 9. 10).
As before, but harpe divided . . 578. *M. troglodytus* (Pl. III. f. 11).
Larger, greyish median interspace of forewing wider; harpe divided 577. *M. pyrrhosticta* (Pl. III. f. 12).

r'. Yellow band of hindwing deeply incurved . . . . . 580. *M. alcedo* (Pl. III. f. 8).
Yellow band of hindwing not strongly incurved . . . . *s'*.

s'. Antemedian band of forewing very prominent; second discal line not dilated distad behind R^1 . 582. *M. sitiene* (Pl. III. f. 18).
Antemedian band less prominent; second discal line somewhat dilated distad behind R^1; wing shorter, distal margin more convex . . . . . 581. *M. angues* (Pl. III. f. 7).

II. Key to the species here not figured (incl. of *fruhstorferi*):—

a. Costal margin of hindwing dilated into a prominent lobe . . 602. *M. aquila*.
No prominent lobe. . . . . *b*.

b. Forewing above with two very prominent creamy bands, one median, the other postdiscal . 589. *M. dohertyi*.
Forewing with a straight brown band from middle of costal margin to hinder angle . . . . *c*.
Not so . . . . . *d*.

c. Transverse lines of forewing above vestigial or absent . . . 608. *M. hemichroma*.
Transverse lines of forewing above distinct . . . . . 607. *M. tinnunculus*.

d. Thorax and head with two strongly marked broad pale stripes . . 612. *M. mitchelli*.
No such stripes . . . . . *e*.

e. Hindwing with very narrow tawny-brown border; no conspicuous yellow abdominal side-patches .	558.	*M. stellatarum.*
Border to hindwing absent or very narrow; abdomen with yellow side-patches	559.	*M. alluaudi.*
Border to hindwing brown or black, or hindwing all black . .		. . *f.*
f. Hindwing below yellow at base or before abdominal margin . .		. . *h.*
Hindwing below white at base .		. . *g.*
Hindwing below white at base, with a feeble yellow tint; no yellow band on upperside of hindwing .	566.	*M. acicula.*
g. Abdomen without yellow side-patches, hindwing without yellow band	616.	*M. splendens.*
Abdomen with white side-patches; hindwing with yellow band .	615.	*M. micacea.*
Abdomen with yellow side-patches; hindwing with yellow band .	565.	*M. bombylans.*
h. Forewing above greenish black from base to straight antemedian band	609.	*M. passalus.*
Forewing above not greenish black from base to that band . .		. . *i.*
i. Antemedian band very broad, including cross-veins . . .	596.	*M. godeffroyi.*
Antemedian band not including cross-veins . . .		. *j.*
j. Tawny-yellow side-patches of abdomen merged together . .	664.	*M. trochilus.*
Tawny-yellow side-patches of abdomen not merged together .		. . *k.*
k. Antemedian band narrow, posterior half filled in with black, conspicuous; discal lines indistinct	601.	*M. semifasciata.*
Not so		. . *l.*
l. Yellow band of hindwing interrupted		. . *m.*
Yellow band of hindwing not interrupted		. . *n.*
m. Palpus whitish grey . . .	598.	*M. glaucoptera.*
Palpus greyish brown . . .	574.	*M. fruhstorferi.*
n. A large costal apical patch on forewing, sharply defined; antemedian band prominent . .	595.	*M. saga.*
No such patch; tail above partly ochraceous; discal lines of forewing not obviously elbowed .	598.	*M. glaucoptera.*
Not so		. . *o.*

o.	Underside of abdomen black, with white mesial patches . . .	603. *M. sylvia.*
	Underside of abdomen grey, or clayish tawny	. . *p.*
p.	Yellow area of hindwing below very sharply defined	. . *q.*
	Yellow area of hindwing below not sharply defined	. . *s.*
q.	Inner edge of distal border of hindwing convex	. . *r.*
	Inner edge of distal border of hindwing straight	590. *M. hirundo.*
r.	Distal border of hindwing broader at R^3 than yellow band . .	590. *M. hirundo.*
	Distal border of hindwing not broader at R^3 than yellow band	586. *M. divergens.*
s.	Brownish black subapical spot SC^5—R^1 of forewing very prominent	573. *M. assimilis.*
	Brownish black subapical spot SC^5—R^1 of forewing not prominent	572. *M. belis.*

III. Key to the ♂♂ as far as they are known to us, based on the sexual armature and colour :—

a.	Harpe divided into two processes (Pl. LI. f. 13)	. . *b.*
	Harpe not divided	. . *c.*
b.	Upper edge of upper process of harpe not densely dentate (Pl. LI. f. 13. 14)	577. *M. pyrrhosticta* (Pl. III. f. 12).
	Upper edge of upper process of harpe dentate (Pl. LI. f. 15) .	578. *M. troglodytus* (Pl. III. f. 11).
c.	Penis without process, or with a very short one	. . *d.*
	Penis with two processes at right side (Pl. LVI. f. 50. 51. 52) .	. . *e.*
	Penis with one process	. . *f.*
d.	Subapical brown spot SC^5—R^1 of forewing distinct	580. *M. alcedo* (Pl. III. f. 8).
	Subapical brown spot SC^5—R^1 of forewing vestigial . . .	576. *M. castaneum* (Pl. III. f. 16).
e.	A band from middle of costal margin to hinder angle of forewing .	608. *M. hemichroma.*
	No such band ; distal process of penis-sheath short . . .	582. *M. sitiene* (Pl. III. f. 18).
	No such band ; distal process of penis-sheath rather long . .	581. *M. ungues* (Pl. III. f. 7).

f. Harpe short, triangular	*g.*
Harpe produced into a slender process of variable length	*j.*
Harpe short; hindtibia with large tuft (scent-organ) . . .	596. *M. godeffroyi.*
g. Harpe pointed, dentate beneath .	*h.*
Harpe obtuse, or not dentate beneath	*i.*
h. Hindwing with tawny band . .	569. *M. vacillans* (Pl. IV. f. 5).
Hindwing with yellow band; distal edge of band not sharply defined	572. *M. belis.*
Hindwing with yellow band; distal edge of band sharply defined .	594. *M. variegatum* (Pl. III. f. 13).
i. Base of hindwing below white, or feebly yellowish . . .	565. *M. bombylans* and 566. *M. aricula.*
Base of hindwing below yellow; yellow band of hindwing above sharply defined; basal area of forewing above not blackish .	592. *M. prometheus* (Pl. IV. f. 3).
Base of hindwing below yellow; band sharply defined; basal area of forewing greenish black .	595. *M. saga.*
Base of hindwing below yellow; band not sharply defined . .	571. *M. particolor* (Pl. IV. f. 13).
j. Harpe gradually thinning to a fine point	*k.*
Harpe straight, not dentate, not pointed	*l.*
Harpe spatulate, or denticulate at or near end, generally curved upwards	*m.*
k. Base of hindwing below yellow; harpe nearly reaching end of clasper	605. *M. corythus* (Pl. IV. f. 1. 7.)
Base of hindwing below yellow; harpe much shorter; process of penis-sheath long and acute .	570. *M. affictitia* (Pl. IV. f. 12).
Base of hindwing below yellow; harpe much shorter; process of penis-sheath obtuse; an antemedian abbreviated band on forewing	601. *M. semifasciata.*
As before; no such band . .	593. *M. nubilum* (Pl. IV. f. 17).
Base of hindwing below white .	616. *M. splendens.*
l. Process of penis-sheath short . .	567. *M. regulus* (Pl. IV. f. 11).
Process of penis-sheath long, pointed	568. *M. gyrans* (Pl. IV. f. 6).
m. At least one of the internal processes (love-daggers) of the penis-sheath pointed	*n.*
Both love-daggers obtuse	*o.*

n. Abdominal side-patches confluent	564. *M. trochilus.*	
Abdominal side-patches separate	598. *M. glaucoptera.*	
o. Costal edge of hindwing strongly lobate	602. *M. aquila.*	
Not lobate; forewing with sharply marked creamy bands	589. *M. dohertyi.*	
Not lobate; head and thorax with two pale conspicuous stripes	612. *M. mitchelli.*	
Not lobate; base of hindwing below white, not yellow	615. *M. micacea.*	
Not lobate; forewing above greenish black from base to straight antemedian band		*p.*
Not lobate; wings and body not as in preceding		*q.*
p. Abdomen below without pale ochraceous mesial patches	609. *M. passalus.*	
Abdomen below with pale ochraceous mesial patches	610. *M. faro* (Pl. IV. f. 14).	
Band of hindwing interrupted	611. *M. meeki* (Pl. IV. f. 2).	
q. Forewing with a number of incomplete white interstitial bands	606. *M. multifascia* (Pl. VI. f. 7).	
No such bands		*r.*
r. Process of penis-sheath ending in a long slender point		*s.*
Process of penis-sheath obtuse, or acute apex very short		*u.*
s. Hindwing with narrow distal border	558. *M. stellatarum.*	
Hindwing with broad distal border.		*t.*
t. Harpe broad (Pl. LI. f. 8)	590. *M. hirundo*, and 591. *M. rectans* (Pl. IV. f. 8).	
Harpe slender; antemedian and discal bands of forewing separate	584. *M. heliophila*, 585 *M. melas*, 587. *M. mediovitta* (Pl. III. f. 6. 19; Pl. IV. f. 16).	
Harpe slender; antemedian and discal bands not separate	575. *M. calescens* (Pl. III. f. 5).	
Harpe slender; band of hindwing tawny	563. *M. pachycerus* (Pl. IV. f. 9).	
u. Proximal tooth of penis-sheath large and triangular	579. *M. insipida* (Pl. III. f. 9. 10).	
Proximal tooth of penis-sheath not large and triangular		*v.*
v. Yellow band of hindwing interrupted	574. *M. fruhstorferi fruhstorferi.*	
Yellow band of hindwing not interrupted		*w.*
w. Distal border of hindwing tawny	561. *M. milvus* (Pl. IV. f. 18).	

Distal border of hindwing brown, not sharply defined, being tawny proximally . . . . . *x*.
Distal border of hindwing brown, sharply defined . . . . 603. *M. sylvia*.
x. Process of penis-sheath short . . 573. *M. assimilis*.
Process of penis-sheath long . . 562. *M. aesalon* (Pl. IV. f. 10).

558. Macroglossum stellatarum.

Hoefn., *Archetyp.* t. 14 (1592); id., *Ins. Volat.* t. 3 (1630); Mouff., *Ins. Theatr.* p. 105 (1634); God., ed. List., *Ins.* p. 20. fig. 14 (1682): Merian, *Eur. Ins.* ii. p. 41. t. 79 (1683); Rains, *Hist. Ins.* p. 133. n. 1 (1710); Bradl., *Works of Nature* t. 26. f. 1. A (1721); Réaum., *Hist. Ins.* i. t. 12. f. 5. 6 (1734); Roes., *Ins. Belust.* i. *Nachte.* i. p. 57. t. 8. f. 5. 6 (1746); Gronov., *Act. Hele.* v. p. 141. n. 313 (1762); Geoffr., *Hist. Ins.* ii. p. 83. n. 6. t. 11. f. 5 (1762); Sepp, *Nederl. Ins.* ii. t. 1. f. 1—11 (1762); Schaeff., *Icon. Ratisb.* t. 16. f. 2. 3 (1766); Degeer, *Mém. Ins.* ii. 1. p. 226. n. 1 (1771); Ernst & Engr., *Pap. Eur.* iii. p. 21. t. 89. f. 116. t. 90. f. 116 (1782).

Sphinx stellatarum Linné, *Syst. Nat.* ed. x. p. 803. n. 27 (1758); id., *Fauna Suec.* p. 288. n. 1091 (1761); Poda, *Mus. Graec.* p. 82. n. 8 (1761); Scop., *Ent. Carn.* p. 187. n. 474 (1763); Hufn., *Berl. Mag.* ii. 2. p. 182. n. 11 (1766); Beckm., *Epit.* p. 161. n 12 (1767); Mein., *Naturf.* i. p. 234 (1774); Müll., *Naturs.* v. 1. p. 643. n. 27 (1774); Fuessl., *Schweiz. Ins.* p. 33. n. 622 (1775); Harris, *Engl. Lep.* p. 14. n. 86 (1775); Schiff. & Den., *Verz. Wien* p. 43. n. 2 (1776); Mad., ed. Kleem., *Raupenkal.* p. 53. n. 146. p. 72. 204 (1777); Blum., *Handb. Naturg.* p. 365. n. 10 (1779); Esp., *Eur. Schm.* ii. p. 114. t. 13. f. 1. 2. 3, p. 204. t. 28. f. 3, p. 232. t. 40. f. 5. 6 (1779); Leske, *Anfangsgr. Nat.* i. p. 457. n. 6 (1779); Goeze, *Ent. Beytr.* iii. 2. p. 177. n. 27 (1780) (excl. var. β); Barb., *Genr. Ins. Linn.* p. 179 (1781): Lang, *Verz. Augsb.* ii. p. 71. n. 574. 575 (1782); Fourcr., *Ent. Paris.* ii. p. 83. n. 6. t. 11. f. 5 (1785); Borkh., *Eur. Schm.* ii. p. 56. 134. 177. n. 3 (1789); Gmel., *Syst. Nat.* i. 5. p. 2387. n. 27 (1790); Schwarz, *Raupenkal.* p. 358. n. 635 (1791); Borkh., *Rhein. Mag.* i. p. 314. n. 139 (1793); Walk., *Faune Paris.* ii. p. 280 (1802); Schrank, *Fauna Boica* ii. 1. p. 229. n. 1394 (1804); Hübn., *Samml. Eur. Schm., Sphing.* t. 9. f. 57 (180–?); id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. *Leg.* A. b. c. f. 1. a. b (180–?); Ochs., *Schm. Eur.* ii. p. 193. n. 4 (1808); Nagel, *Hülfsb. Schm.* p. 159 (1818); God., *Lép. France* i. p. 55. t. 19. f. 3 (1821); Beske, in Silberm., *Rev. Ent.* ii. p. 177 (1834) (Hamburg); Luc., *Lép. Eur.* p. 109. t. 44 (1834).

Sesia stellatarum, Fabricius, *Syst. Ent.* p. 548. n. 3 (1775) ("Schaeff., Elem. t. 116" alia spec.); id., *Spec. Ins.* ii. p. 154. n. 6 (1781) ("*belis*" alia spec.); id., *Mant. Ins.* ii. p. 99. f. 6 (1787); Rossi, *Fauna Etr.* ii. p. 164. n. 1058 (1790); View., *Tab. Verz.* i. p. 13. n. 1 (1790); Fabr., *Ent. Syst.* iii. 1. p. 380. n. 5 (1793); Latr., in *Nouv. Dict. Hist. Nat.* xxxii. p. 28 (1819); Lep. & Serv., *Enc. Méth.* x. p. 465. t. 67. f. 3 (1825).

Sphinx stellataris (!), Cramer, *Pap. Exot.* i. p. 147 (1776).

Macroglossum stellatarum, Scopoli, *Intr. Hist. Nat.* p. 414 (1777); Latr., *Gen. Ins. Crust.* iv. p. 210 (1809); Sam., *Ent. Comp.* p. 244 (1819); Blanch., *Hist. Nat. Ins.* iii. p. 478 (1840).

Sphinx flaccida Retzius, *Gen. Ins.* p. 33. n. 22 (1783).

Scia stellatarum, Oken, *Lehrb. Naturg.* iii. 1. p. 750. n. 3 (1815).

Macroglossa (!) *stellatarum*, Ochsenheimer, *Schm. Eur.* iv. p. 42 (1816); Steph., *Illustr. Brit. Ent., Haust.* i. p. 133 (1828); id., *Cat. Brit. Ins.* ii. p. 34 (1829); Boisd., *Ind. Meth.* p. 45. n. 471 (1829); Cant., in Silberm., *Rev. Ent.* i. p. 76 (1833) (Dépt. Var); Friv., in Silberm., *ibid.* ii. p. 181 (1834) (Hungary); Thon, *Nat. Schmett.* p. 102. t. 51. f. 716–718 (1837); Curt., *Brit. Ent.* xvi. t. 747 (1839); Ramb., *Faune Andal.* p. 334 (1842); Westw. & Humphr., *Brit. Moths* p. 24. t. 6. f. 1. 2. 3 (1843); Eversm., *Fauna Volgo-Ural.* p. 107 (1844); Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847); Lucas, *Expl. Sc. Algérie, Art.* iii. p. 370. n. 64 (1849) (v. vi.); Walk., *List Lep. Ins. B. M.* viii. p. 86. n. 1 (1856); Mann, *Wien. Ent. Mon.* iii. p. 91 (1859) (Sicily); Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.); Mann, *l.c.* vi. p. 366 (1862) (Brussa); Pioch., *Ann. Soc. Ent. France* p. 666 (1863) (albinistic ?, Yonne); Ball., *Bull. Moscou* p. 364 (1861) (Gorki); Girard, *Bull. Soc. Ent. France* p. 49 (1865) (Paris, in i.); Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg); Snell., *Vlind. Nederl.* p. 92 (1867) (v. ix.); Orza, *Lep. Japon* p. 35. n. 77 (1868); Bien., *Lep. Erg. Reise Pers.* p. 33 (1869) (Asterabad; Tschehar-deh; iv.); Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 78 (1870) (Breda); Brutt., *Progr. Gymn. Dorpat* p. 24. n. 13 (1872); Christ., *Hor. Soc. Ent. Ross.* x. p. 31 (1873) (N. Persia, common); Siebke, *Enum. Ins.*

Norr. iii. p. 25. n. 1 (1874) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 337. n. 8 (1875) ; Oberth., *Et. Ent.* i. p. 31 (1876) (Algérie) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 524. n. 1 (1877) ; Staud., *Hor. Soc. Ent. Ross.* xiv. p. 300 (1878) (As. min.) ; Oberth., *l.c.* v. p. 28. n. 71 (1880) (Mongolia, vi.) ; Weil., *Progr. Oberrealsch. Innsbruck* p. 15 (1880) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 46 (1880) ; Albr., *Bull. Moscou* p. 379 (1882) (Moscow) ; Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 245. t. 3. f. 1—12 (1882) (larvae) ; Rom., *Mém. Lép.* i. p. 72 (1884) (Caucasia) ; Swinh., *Proc. Zool. Soc. Lond.* p. 514. n. 8 (1884) (Kurrachi, vii.) ; Lampa, *Ent. Tidskr.* vi. p. 27. n. 122 (1885) ; Poult., *Trans. Ent. Soc. Lond.* p. 298 (1885) (postembr. developmt.) ; Swinh., *ibid.* p. 347. n. 7 (1885) (S. Afghanistan, common) ; Butl., *Proc. Zool. Soc. Lond.* p. 378. n. 91 (1886) (Murree, viii. ix., not uncommon) ; Fixs., in Rom., *Mém. Lép.* iii. p. 322. n. 100 (1887) (Corea, vi.) ; Amel., *Berl. Ent. Zeitschr.* xxxi. p. 261 (1887) (Dessau) ; Swinh., *Journ. Bombay N. H. Soc.* iii. p. 117 (1888) (Karachi, vii.) ; Graes., *Berl. Ent. Zeitschr.* xxxii. p. 106, n. 194 (1888) (Amurland) ; Leech, *Proc. Zool. Soc. Lond.* p. 582. n. 8 (1888) (Japan ; China) ; Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889) ; Christ., in Rom., *Mém. Lép.* v. p. 11. n. 40 (1889) ; Alph., *ibid.* v. p. 224. n. 21 (1889) (Teneriffe) ; Gr.-Grschm., *ibid.* iv. p. 514. n. 212 (1890) (Pamir, up to 8000 ft.) ; Baker, *Trans. Ent. Soc. Lond.* p. 204 (1891) (Madeira) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 3. n. 9 (1892) (Cochinchina) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 113. n. 183 (1892) ; Kirby, *Cat. Lep. Het.* i. p. 629. n. 3 (1892) ; Alph., in Rom., *Mém. Lép.* vi. p. 3. n. 70 (1892) (China) ; Staud., *ibid.* vi. p. 239. n. 230 (1892) ; Hoffm., *Raup Grossschm.* p. 31. t. 8. f. 9 (1893) ; id., *Grossschm.* p. 31. n. 1. t. 18. f. 9 (1894) ; White, *Butt. Moths Teneriffe* p. 70 (1894) ; Riff., *Iris* viii. p. 170 (1895) (aberr.) ; Bartel, *Lep. Brit. Is.* ii. p. 66. n. 1. t. 54. f. 1. 1 a—e (1895) ; Holtz, *Illustr. Zeitschr. Ent.* ii. p. 63 (1897) (Cilicia, common) ; Schultz, *ibid.* ii. p. 395 (1897) (gynandr. spec.) ; Vos, *Tijdschr. Ent.* xli. p. 80 (1898) (Apeldoorn) ; Schultz, *l.c.* iii. p. 11 (1898) (gynandr. spec.) ; Hamps., *Journ. Linn. Soc. Lond.* xxvii. p. 412 (1899) (L. Urmi, N.W. Persia) ; Nurse, *Journ. Bombay N. H. Soc.* xii. p. 513 (1899) (Cutch) ; Bartel, in Rühl, *Grossschm.* ii. p. 215 (1900) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 104. n. 768 (1901).

Hemaris stellatarum, Dalman, *Kungl. Vet. Ak. Handl.* p. 207 (1816).

Sphynx stellatarum, Vogel, *Schm. Cabin.* ii. p. 20. t. 8. f. 6. a. b. c. (1820).

Psithyros stellatarum, Hübner, *Verz. bek. Schm.* p. 132. n. 1409 (1822).

Ramphoschisma (!) *stellatarum*, Wallengren, *Skand. Het. Fjär.* p. 10 (1863).

Rhamphoschisma stellatarum, id., *l.c.* p. 51 (1863) : Tengstr., *Act. Soc. F. F. Fenn.* x. p. 7. n. 100 (1869) ; Theden., *Ent. Tidskr.* ii. p. 105 (1881).

Macroglossa nigra Cosmovici, *Le Natural.* xiv. p. 280 (1892).

Macroglossa nivea (!), Kirby, Nov. Zool. i. p. 99 (1894).

♂ ♀. Antenna strongly clubbed, hook short ; end-segment not much prolonged. Conspicuous aberrations are rare ; hindwing sometimes tawny ; forewing occasionally with blackish median band. There is no apparent geographical variation.

♂. Tenth tergite slender, gradually narrowed to a point, slightly hooked, not dilated before tip either vertically or horizontally ; sternite round at end. Clasper without friction-scales ; harpe slightly curved, rounded-dilated at end, here rough with short spines and teeth. Penis-sheath with one long, slender, pointed process, which is densely and heavily dentate on the proximal surface ; base of process also heavily dentate, dilated distad ; internal rods obtuse, one clubbed and armed with a notched ridge, the other flat, concave on one side, with the edge finely serrate.

Larva green or reddish brown, dotted with white ; stigmata and tubercles of horn black ; a dark dorsal line ; a white dorso-lateral line and a yellow ventro-lateral one, both bordered with brown ; these lines sometimes indistinct.—Food-plant : *Galium* and other *Rubiaceae*.

Cremaster of pupa conical.

Hab. Europe (except the far north), east and southwards to Japan, Cochinchina, South India, and North Africa.

In the Tring Museum 6 larvae, 1 pupa, 120-odd specimens from : various places in Europe ; Mazagan, Morocco, vii. viii. (Riggenbach) ; Ajmere, vii. ; Kandahar ; Quetta ; Foochow, iv. ; Nanchuen, Setschuen ; Wladimir Bay, viii. ; Wei-hai-wei, ix. ; Yokohama, vii. : Tsushima, x. xi.

559. Macroglossum alluaudi.

**Macroglossa alluaudi* Joannis, *Bull. Soc. Ent. France* p. 52 (1893) (Seychelles ;—Mus. Paris) ; id., *Ann. Soc. Ent. France* p. 430. n. 21. t. 15. f. 1 (♀) (1894) (Mahé, Seychelles ; descr. of larva). *Macroglossa* (?) *alluardi* "All." (!), Kirby, Nov. Zool. i. p. 99. n. 64 (1894).

♂♀. A peculiar insect, with chrome-yellow hindwings, which are slightly shaded with orange distally ; base of hindwing not brown, fringe brown ; sometimes a narrow brown marginal band. Abdomen with three orange-yellow side-spots ; two discal lines of forewing heavy, straight, no stigma ; *below*, basal half of forewing, cell excepted, and the greater part of the hindwing washed with pale chrome-yellow.

Not dissected.

Larva shortly described in *Ann. Soc. Ent. France*, *l.c.*

Hab. Mahé, Seychelles. Type in Mus. Paris ; another specimen in coll. Joannis : a third in coll. Staudinger.

560. Macroglossum soror spec. nov. (Pl. IV. f. 19, ♀).

♀. Differs from *M. milvus* in the following points : abdomen with four large side-patches which are *not* separated from one another and are of a deep ferruginous colour ; stigma of forewing rather large, first antemedian line straighter, second more distal, touching stigma ; hindwing orange-rufous, shaded with ferruginous distally, without a yellow band, base *not* darker than middle of wing, fringe pale brown. From *alluaudi* it is distinguished by the almost obliterated first discal line of the forewing, the curved second discal line, the conspicuous stigma, the much deeper coloured hindwing and under surface, and the four large abdominal side-patches.

Hab. Bourbon (Île de France), 1 ♀ in Mus. Paris, *type* ; another in the Dublin Museum.

561. Macroglossum milvus.

**Macroglossa milvus* Boisduval, *Faune Mad. Bourb.* p. 78. n. 1. t. 10. f. 3 (1833) (Bourbon ; Mauritius ;—coll. Charles Oberthür) ; Walk., *List Lep. Ins. B. M.* viii. p. 90. n. 10 (1856) ("Madagascar" ex err.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 336. n. 7 (1875) (Bourbon ; Mauritius) ; Butl., *Trans. Zool. Soc. Lond.* iv. p. 524. n. 7 (1877) ("Madagascar" alia spec.) ; Mabille, *Ann. Soc. Ent. France* p. 299 (1879) ("Madagascar" ex err.) ; Saalm., *Lep. Mad.* p. 118. n. 269 (1884) (Maurit. ; Bourb. ; "Madag." ex err.) ; Vins., *Pap. Bourbon* p. 13 (1891) ; Kirby, *Cat. Lep. Het.* i. p. 631. n. 36 (1892) ("Madagasc." ex err.).

Macroglossa pandora, Guérin (*nom* Fabricius, 1793), *Icon. Règne Anim.* ii. p. 495 (1844) (*=milvus*).

Macroglossa mylvus (!), Ménétriés, *Enum. Corp. Anim. Petr., Lep.* p. 95. n. 1582 (1857) (Mauritius).

Macroglossa melvus (!), Rothschild, Nov. Zool. i. p. 66 (1894).

♂♀. Head and thorax with a darker mesial line ; mesothoracic tegula chestnut laterally in fresh specimens. Abdomen with four orange side-patches, of which the first is the smallest. Hindwing bright tawny, without dark border ; an antemedian ill-defined yellow band ; extreme base brownish black. Underside of thorax clayish vinaceous cinnamon ; palpus more grey, with a purer white side-stripe ; abdomen tawny. Wings bright tawny beneath, with a duller brown inconspicuous distal border, extreme bases more or less yellow, especially near abdominal edge of hindwing.

♂. Sexual armature as in *M. aesalon*, but dentate process of penis-sheath more obtuse, and the broader internal rod wider apically.

Hab. Bourbon ; Mauritius.

In the Tring Museum 6 ♂♂, 3 ♀♀ from Bourbon and Mauritius.

The species does not occur in Madagascar ; the specimens recorded from there as *milvus* are not this species, but *M. aesalon*.

562. **Macroglossum aesalon** (Pl. IV. f. 10, ♀).

Macroglossa milvus, Pollen & Vandam (*non* Boisduval, 1833), *Faune Madag., Ins.* p. 5 (1868) (Nossi-bé) ; Walk., *l.c.* (1856) (Madagascar) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 524. n. 7 (1877) (partim ; Madagascar) ; id., *Cist. Ent.* ii. p. 392 (1879) (Antananarivo) ; Saalm., *l.c.* (1884) (partim ; Madag.).

**Macroglossa aesalon* Mabille, *Ann. Soc. Ent. France* p. 299 (1879) (S.E. Madag. ; partim ;—coll. Mabille) ; Saalm., *Lep. Mad.* p. 118. n. 270 (1884) (Madag.) ; Kirby, *l.c.* p. 631. n. 42 (1892) (Madag.).

(?) *Macroglossa trochilus*, Saalmüller (*non* Hübner, 1824), *l.c.* p. 118. n. 273 (1884) (Mauritius).

♂♀. Abdomen with four orange side-patches, the first and fourth generally small ; a black mesial spot at the base of the anal brush ; underside tawny, a series of more or less confluent brown patches at each side, or nearly all tawny, or brown with three series of tawny patches. Palpus white, shaded with brown scales. Breast vinaceous brown, clayish in middle.

Wings, *above*.——Forewing : two antemedian lines, oblique, curving basad behind, slightly converging in front, interspace more or less filled up with black scaling, especially in ♂ : median interspace grey, with a distinct but minute black stigma ; first and second discal line distinct, curved costad in front, the second almost angulate behind R^1, the black scaling extending distad from this line to the third faint one, limiting a trapezoidal grey costal space, distally of which there are two elongate dark patches, the upper less distinct than the lower.——Hindwing with a broad blackish brown border which becomes purple-brown on disc; yellowish orange median band broad, base brownish black.

Hindwing, *below*, with the abdominal area and extreme base yellow, three discal lines.

♂. Tenth tergite convex at tip, not pointed (Pl. XLV. f. 8) ; sternite simple. Clasper without friction-scales ; harpe (Pl. L. f. 27) slender, spatulate, the dilated apical part denticulate. Penis-sheath (Pl. LVI. f. 15) with a rather broad, obtuse, dentate, horizontal process, the series of teeth of the proximal edge extending far proximad on the sheath ; two obtuse internal rods.

Hab. Madagascar ; Mauritius ; Comoro Islands.

In the Tring Museum 14 ♂♂, 13 ♀♀ from : Mauritius (Trimen, vii. 1865, ex coll. Felder) ; and Madagascar.

The two individuals (♂, ♀) from Grande Comore in the collection of Mons. Charles Oberthür differ in the median interspace of the forewing being narrower than in the ordinary Madagascar individuals, in the distal border of the hindwing being angulate before SM^2, which is seldom the case in specimens from other localities, and in the dentate process of the penis-sheath being longer.

563. **Macroglossum pachycerus** spec. nov. (Pl. IV. f. 9, ♂).

Macroglossa aesalon Mabille, *l.c.* (1879) (partim).

♂. Similar to *aesalon*, but distinguished by the following characters : antenna obviously longer and thicker, end-segment shorter, not longer than the three preceding segments together ; abdomen with three orange side-spots, segments 5 to 7 black, contrasting sharply with the preceding segments, base of sixth white ;

tips of longest scales of anal brush cream-colour or buff; underside of palpus, middle of breast, and first and second pair of legs cream-colour, mesial patches on first three sternites of abdomen nearly the same colour, rather more tawny.

Wings, *above*.——Forewing deeper in colour than in *aesalon*, the markings less prominent; second discal line heavier, interspace between first and second nearly filled up with blackish scaling; no stigma.——Orange band of hindwing narrower.

Underside: yellow colour of hindwing less extended distad than in *aesalon*, more sharply defined, discal lines less distinct or absent.

♂. Tenth tergite (Pl. XLV. f. 7) narrower at end than in *aesalon*; the sternite, however, broader. Harpe (Pl. L. f. 26) broader, apex curved basad and densely spinose. Dentate process of penis-sheath (Pl. LVI. f. 16) long, acute; only one internal rod, three-edged.

♀. Not known.

Hab. Madagascar.

In coll. Charles Oberthür from Tamatave (*type*) and Fianarantsoa; also in coll. Mabille.

In the Tring Museum 2 ♂♂ from: Madagascar.

564. Macroglossum trochilus.

Psithyros trochilus Hübner, *Samml. Ex. Schm.* ii. t. 158 (1824).

♂ ♀. Antenna long, reaching in ♂ to the fork SC^{4+5}, or beyond. Orange-buff side-patches of segments 2 to 4 of abdomen large, merged together; underside of abdomen and wings ferruginous; breast, extreme base of wings, and side-tufts of abdomen pale maize-yellow, palpus purer white; distal margin of wings below with a russet-brown border. The brownish black distal marginal band of the hindwing above proximally bordered with chestnut-purple; median area orange-buff, rather sharply defined.

♂. Tenth tergite pointed; sternite rounded at tip. Clasper without friction-scales; harpe short, curved upwards, obtuse, the broader apical part hollowed out at the proximal side, the convex side densely beset with teeth (Pl. L. f. 25). Penis-sheath (Pl. LVI. f. 54) with a longer sharply pointed and a shorter apically rounded internal rod; apical process horizontal, long, its proximal edge denticulate.

Cremaster of pupa flattened, triangular, dentate laterally, ending in a point (Pl. LXIV. f. 20).

Hab. Africa; Comoro Islands.

Two subspecies:

a. M. trochilus trochilus.

Psithyros trochilus Hübner, *l.c.*

Macroglossa trochilus, Boisduval, in Deleg., *Voy. Afr. Austr.* p. 594. n. 97 (1847) (Natal); Walker, *List Lep. Ins. B. M.* viii. p. 90. n. 8 (1856) (Cape; Natal); Mén., *Enum. Corp. Anim. Petrop., Lep.* p. 95. n. 1584 (1857) (Natal); Boisd., *Spec. Gén. Lép. Hét.* i. p. 1. p. 335 (1875) (Natal; Zululand); Butl., *Trans. Zool. Soc. Lond.* ix. p. 525. n. 13 (1877); Oberth., *Ann. Mus. Civ. Genova* xviii. p. 735. n. 85 (1883) (Shoa, x.); Kirby, *Cat. Lep. Het.* i. p. 629. n. 1 (1892) (S. Afr.); Dist., *Nat. Transvaal* p. 236 (1892) (Pretoria, ii.).

Macroglossa sitiene Walker, *l.c.* p. 92. n. 13 (1856) (partim; Natal; haec spec. ? err. loci?).

Rhamphoschisma fasciatum Wallengren, *Oefv. Vet. Ak. Handl.* xv. p. 139 (1858).

Rhamphoschisma trochilus, id., *Kongl. Sv. Vet. Ak. Handl.* v. 4. p. 17 (1865) (Caffr. or.; Natal).

Macroglossa lysithous Boisduval, *l.c.*

Macroglossa trochiloides Butler, *Proc. Zool. Soc. Lond.* p. 843. n. 122 (1896) (Nyassaland, 7400 ft.; perfectly typical!).

♂ ♀. The purplish border of the marginal band of the hindwing, above, rather broad as a rule.

Hab. South and East Africa, from Cape Colony to Abyssinia: Comoro Islands.

In the Tring Museum 5 larvae, 2 pupae, 130-odd specimens from: Cape Colony; Natal; Delagoa Bay; Transvaal; Barotse country; Nyassaland; German and British East Africa; Uganda: Grande Comore.

b. M. trochilus trochiloides.

**Macroglossa trochiloides* Butler, *Proc. Zool. Soc. Lond.* p. 5. n. 6 (1875) (Sierra L.;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 525. n. 14 (1877); Ploetz, *Stett. Ent. Zeit.* xli. p. 76. n. 280 (1880) (Mungo); Holl., *Trans. Amer. Ent. Soc.* xvi. p. 56. n. 1 (1889) (Ogowé, Benita): Kirby, *Cat. Lep. Het.* i. p. 619. n. 2 (1892) (Sierra L.).

Macroglossa trochilus, Dewitz, *Mitth. Münch. Ent. Ver.* iii. p. 23 (1879) (Chinchoxo); Druce, in Jameson, *Story Rear Col.* p. 446 (1887) (Aruwimi, iv.).

♂ ♀. The differences between this and the preceding race are very slight. The median band of the hindwing is paler yellow, and the marginal band more extended black, less brown-purple.

Hab. Sierra Leone to Angola and the Upper Congo.

In the Tring Museum 16 ♂♂, 10 ♀♀ from: Sierra Leone, vi. vii. (Capt. Stevens); Ogrugu, Niger; Yelwa, Borgu, Niger; Calweha R., Angola, v. (Penrice).

565. Macroglossum bombylans.

Macroglossa gilia, Walker (*non* Herrich-Sch., 1854), *List Lep. Ins. B. M.* viii. p. 93. n. 15 (1856) (partim).

**Macroglossa bombylans* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 334. n. 2 (1875) (Centr. Asia;—coll. Charles Oberthür); Butl., *Trans. Zool. Soc. Lond.* ix. p. 525. n. 10 (1877) (N. India; Dehra Dun; Hongkong); Saalm., *Lep. Mad.* p. 118. n. 272 (1884) ("Mad." loc. err.); Leech, *Proc. Zool. Soc. Lond.* p. 582. n. 6 (1888) (Satsuma, v.; Nikko, ix.; Oiwake, x.; Kiukiang); id., *Trans. Ent. Soc. Lond.* p. 120. n. 105 (1889) (Kiukiang); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 3. n. 12 (1892) (India); Kirby, *Cat. Lep. Het.* i. p. 630. n. 14 (1892); Alph., in Rom., *Mém. Lép.* ix. p. 119 (1897) (Szé-tchuen, viii.); Leech, *l.c.* p. 292. n. 78 (1898) (Japan; China).

**Macroglossa walkeri* Butler, *Proc. Zool. Soc. Lond.* p. 4 sub n. 3 (1875) (= *gilia* Walk.;—Mus. Brit.); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 116. n. 191 (1892); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 418. n. 191 (1898) (Sikhim, 3000—7000 ft., rainy seas.).

♂ ♀. The base of the sixth abdominal tergite and the side-tuft of the third segment are pure white; the breast has no yellow tint, the first two or three abdominal sternites have a white mesial patch. The hindwing of the ♀ has a more or less complete yellow median band, while the band of the ♂ is reduced to an abdominal and a costal patch.

♂. The sexual armature is as in *aricula*, but the dentate process of the penis-sheath (Pl. LVI. f. 41) is decidedly shorter and the harpe (Pl. L. f. 24) a little more obtuse.

Early stages not known.

Hab. Japan; China; North India.

This and *aricula* are most likely only geographical forms of one species. There is no material in collections from Burma, Malacca, Sumatra, and Borneo, where either *aricula* or *bombylans* must be expected to occur.

In the Tring Museum 60-odd specimens from: Asamayama, viii.: Satsuma, v.: Kinshiu: Nanchuen, Setchuen: Ta-tsien-lu; Hongkong; Buxa, Bhutan; Khasia Hills.

566. Macroglossum avicula.

Macroglossa gilia, Walker (*non* Herrich-Schäffer, 1854), *List Lep. Ins. B. M.* viii. p. 93. n. 15 (1856) (partim ; Java).

**Macroglossa avicula* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 334. n. 3 (1875) ("Inde centrale" err. loc. ; Java ;—coll. Charles Oberthür) ; Butl., *Proc. Zool. Soc. Lond.* p. 240 (1875) (Java) ; id., *Trans. Zool. Soc. Lond.* p. 525. n 9 (1877) (Java) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 3. n. 13 (1892) (Java) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths.* i. p. 116. n. 192 (1892) (Java) ; Kirby, *Cat. Lep. Het.* i. p. 630. n. 12. (1892) (Java ; *non* "India") ; Pagenstecher, *Jahrb. Nass. Ver. Nat.* xlvii. p. 30 (1894) (Palawan) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 357. n. 3 (1895) (Java) ; Piep., *Tijdschr. Ent.* xl. p. 102. t. 4. f. 8 (larva) (1897) (Java).

Macroglossa obscuripennis Butler, *l.c.* p. 633 (1877) (= *avicula* !).

♂ ♀. The long scales at the base of the sixth tergite yellow ; breast, bases of wings below and side tufts of abdomen with a yellow tint, not pure white. The yellow median band of the hindwing of other *Macroglossum* is indicated at the abdominal margin in the ♂, while in the ♀ there is also some yellow scaling behind and before the cell. Antenna strongly clubbed.

♂. Tenth tergite narrow, pointed ; sternite sinuate at end in an apical view. Clasper without friction-scales ; harpe as in *bombylans*, a little more pointed. Penis-sheath (Pl. LVI. f. 42) with two obtuse internal rods ; apical dentate process short, but longer and slenderer than in *bombylans*.

Larva figured by Piepers, *l.c.*

Hab. Malayan Subregion : Java ; Palawan.

In the Tring Museum 4 ♂♂, 4 ♀♀ from Java.

567. Macroglossum regulus (Pl. IV. f. 11, ♂).

Macroglossa gyrans Walker, *l.c.* (partim ; Canara).

**Macroglossa regulus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 335. n. 5 (1875) (Coromandel ;—coll. Charles Oberthür) ; Kirby, *Cat. Lep. Het.* i. p. 630. n. 9 (1892).

**Macroglossa fervens* Butler, *Proc. Zool. Soc. Lond.* p. 4. n. 3. t. 1. f. 3 (1875) (Canara ;—Mus. Tring) ; id., *Trans. Zool. Soc. Lond.* ix. p. 525. n. 8 (1877); Kirby, *l.c.* n. 11 (1892); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 112. n. 179 (1892) (= *regulus* ; Canara ; Nilgiris).

♂ ♀. Antenna stout and long. Upperside of head, thorax, and first three abdominal segments greenish ; orange side-spots on segments 2 to 7 large and confluent; rest of tergites deep brownish black, base of seventh pure white, this belt not interrupted, tips of long scales of anal brush tawny ; side-tuft of third segment white, of fifth black with buff tip. Underside of palpus nearly pure white, breast and legs (posterior tarsus excluded), the greater part of the first sternite and a mesial spot on the second and third creamy ; extreme base of wings maize-colour.

Wings, *upperside*.——Forewing : two antemedian lines curved basad behind, interspace black ; no stigma ; first discal line thin, second widened, angulate behind R^1, the dark scaling extended along hinderside of R^1 to subapical double spot, a subquadrate grey patch at proximal side of these spots.——Hindwing chestnut-red, not darker at base, but distal margin slightly blackish, this colour not forming a well-defined border.

Underside of wings like upperside of hindwing.

♂. Tenth tergite pointed, slender at end ; sternite subtruncate, black at end. Clasper without friction-scales ; harpe (Pl. L. f. 36) slender, simple, straight, shorter than in *gyrans* (Pl. L. f. 35), but similar in shape. Penis-sheath (Pl. LVI. f. 17) with short process, which is denticulate at the distal edge ; two obtuse internal rods.

Hab. South India and Ceylon.

In the Tring Museum 5 ♂♂, 2 ♀♀ from : Nilgiris ; Ceylon.

568. Macroglossum gyrans (Pl. IV. f. 6, ♂).

**Macroglossa gyrans* Walker, *l.c.* viii. p. 91. n. 11 (1856) (partim ; Madras ; Ceylon ; N. India ; Hindostan ;—Mus. Brit.) ; Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 262. n. 601 (1857) (N. India) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 336. n. 6 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 524. n. 5 (1877) ; Snell., *Tijdschr. Ent.* xx. p. 1. n. 1 (1877) (Java) ; Moore, *Lep. Ceylon* ii. p. 30. t. 93. f. 1 (1882) ; id., *Journ. As. Soc. Bengal* liii. 2. p. 234. n. 4 (1884) (Cachar) ; Swinh, *Proc. Zool. Soc. Lond.* p. 287. n. 2 (1885) (Poona, v. ; Bombay) ; id., *Journ. Bombay N. H. Soc.* iii. p. 117. n. 2 (1888) (Karachi, vii.) ; id., *Proc. Zool. Soc. Lond.* p. 434. n. 2 (1886) (Mhow, vii. ix. xi.) ; id., *Cat. Lep. Het. Mus. Ox.* i. p. 7. n. 29 (1892) ; Kirby, *Cat. Lep. Het.* i. p. 630. n. 8 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 113. n. 181 (1892) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 357. n. 2 (1895) (Java) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 417. n. 181 (1898) ("not seen").

**Macroglossa zena* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 337. n. 9 (1875) (Simla ;—coll .Charles Oberthür).

**Macroglossa bombus* Mabille, *Ann. Soc. Ent. France* p. 347 (1880) ("Madagascar" *err. loci*) ; Saalm., *Lep. Mad.* p. 118. n. 271 (1884).

**Macroglossa burmanica* Rothschild, Nov. Zool. i. p. 68. t. 5. f. 3 (1894) (Burma).

Macroglossa ferrens?, Pagenstacher, *Jahrb. Nass. Ver. Nat.* xlix. p. 155. n. 113 (1896) (Sumba).

♂♀. End-segment of antenna shorter than the three preceding segments together. Upperside of head, thorax, and basal half of abdomen of the same grey colour as the forewing ; posterior abdominal tergites not much darker, except a basal spot on each side, which spots are sometimes enlarged ; three orange side-patches on segments 2 to 4, large, confluent ; first tergite and metanotum also tawny at side ; base of seventh white, the belt interrupted in middle by a black spot ; *underside* of palpus and breast almost pure white, legs included, except last tarsus ; sides of breast and legs shaded or speckled with brown scales ; abdomen drab, side-tuft of third segment white, of sixth brownish black with buff tip.

Wings, *upperside*.——Forewing varying in length from 16 to 23 mm. ; two antemedian and two discal lines distinct, with the interspaces not filled up with black, the two discal lines strongly curved costad at R^2, concave between R^3 and hinder margin.——Hindwing *not* darker at base than in middle, tawny-ferruginous, gradually becoming brown distally, the brown border not being sharply defined.

Underside dull ochraceous tawny, shaded with drab, bases more ferruginous, abdominal area of hindwing pale yellow at base, ochraceous rufous distally ; lines not prominent.

♂. Tenth tergite slightly dilated before the end, which is pointed ; sternite flattened, thin, sides oblique before end. Harpe elongate, straight, simple (Pl. L. f. 35) ; clasper without friction-scales. Penis-sheath (Pl. LVI. f. 18) : dentate process pointed, long, oblique in position, its base projecting distad, no spines at or near base ; internal rod obtuse, dentate at one edge.

Hab. Ceylon, N.W. India, eastwards to Letti and Kisser.

In the Tring Museum 15 ♂♂, 15 ♀♀ from : Nilgiris ; Madras, xi. xii. ; Bombay ; Ajmere, vii. ; Burma ; Sarawak ; Java ; S. Flores, xi. 1896 (Everett) ; Sumba, ii. 1896 (Doherty) ; Letti, vii. 1892 (Doherty) ; Kisser, vi. 1901 (Kühn).

The individual described as *bombus* by Mons. Mabille was said to be from Madagascar. It is certainly an Indian specimen picked up in India by a captain or a doctor, and brought to Madagascar, where it became mixed up with true Madagascar insects. The same happened, doubtless, with the individuals of *Hippotion boerhaviae* recorded from Madagascar by Mons. Mabille. The type of *bombus* does not differ from *gyrans*.

It is very curious that in this species and several others the variation in size is considerable, and especially that the intermediate sizes seem to be rarer than the more extreme individuals. We have here cases of imperfect dimorphism. The name of *burmanica* is based on a very small specimen.

569. Macroglossum vacillans (Pl. IV. f. 5, ♂).

**Macroglossa vacillans* Walker, *l.c.* xxxi. p. 27 (1864) (Timor ;—Mus. Oxford) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 524. n. 2 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 630. n. 6 (1892) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 8. n. 30. t. 1. f. 3 (*type*) (1892).

**Macroglossa approximata* Walker, *l.c.* xxxi. p. 27 (1864) (N. Australia ;—Mus. Brit.) ; Butl., *l.c.* n. 6 (1877) ; Kirby, *l.c.* n. 10 (1892).

**Macroglossa pseudogyrans* Rothschild, Nov. Zool. i. p. 68. t. 5. f. 23 (1894) (Dili, Timor; Flores;—Mus. Tring).

**Macroglossa similis* id., *l.c.* (1894) (Oinanisa, Timor ;—Mus. Tring)

**Macroglossa affictitia*, Pagenstecher (*nec* Butler, 1875), *Jahrb. Nass. Ver. Nat.* xlix. p. 154. n. 112 (1896) (Sumba).

♂♀. End-segment of antenna longer than the three preceding segments together. In colour similar to *affictitia*, forewing nearly as in *gyrans* : essentially different from both in the abdomen being marked with *four* pale cadmium-yellow side-patches which are *separated* from one another by brownish black basal patches ; the second and third patch the largest ; seventh tergite as in *affictitia*, without the extended white base of *gyrans* ; abdomen below and wings rather more tawny than in *affictitia*, the former with vestiges of pale mesial patches, side-tuft of fourth segment buffish, not white.

Wings, *above*.——Forewing : lines not prominent, two antemedian ones almost straight, first two discal ones much less curved than in *gyrans*.——Hindwing russet-mummy-brown at base, an ill-defined distal border of the same colour, middle of wing paler, especially between apex of cell and anal angle, where there is generally a distinctly yellow shade if the long yellow hair-scales are not rubbed away ; in fresh specimens the whole median area is covered with such yellow hair-scales.

Underside : basal area of forewing, especially at costal vein, shaded with yellow hair-scales : abdominal area of hindwing more extended yellow than in *gyrans*.

♂. Tenth tergite obtusely pointed, not dilated laterally before end ; sternite black distally, narrow, sides parallel, end rounded, somewhat incrassate. Clasper *with* friction-scales ; harpe short, acutely triangular, ventral edge denticulate (Pl. L. f. 34). Process of penis-sheath (Pl. LVI. f. 19) ending in a long point, distal edge with a few teeth in middle, proximal edge dentate at least in basal half, base projecting distad.

Length of forewing varying from 16 to 23 mm.

Hab. Sambawa, eastwards to Queensland.

In the Tring Museum 16 ♂♂, 12 ♀♀ from : Tambora, Sambawa, iv. v. 1896 (Doherty) ; Dili, Portug. Timor, v. 1892 (Doherty) ; Oinanisa, Dutch Timor, xi. xii. 1891 (Doherty) ; Larat, Tenimber (Kühn) ; Queensland.

M. similis is based on small individuals.

570. Macroglossum affictitia (Pl. IV. f. 12, ♂).

**Macroglossa affictitia* Butler, *Proc. Zool. Soc. Lond.* p. 240. n. 4. t. 36. f. 7 (1875) (Canara ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 524. n. 3 (1877) ; Moore, *Lep. Ceylon* ii. p. 30. t. 90. f. 3 (1882) ; Kirby, *Cat. Lep. Het.* i. p. 629. n. 5 (1892) (partim) : Hamps., in Blanf., *Fauna*

Brit. Ind., Moths i. p. 113. n. 182 (1892) (partim) ; Nurse, *Journ. Bombay N. H. Soc.* xii. p. 513 (1899) (Cutch).

**Macroglossa vialis* Butler, *Proc. Zool. Soc. Lond.* p. 240. n. 5. t. 36. f. 5 (1875) (Canara ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 524. n. 4 (1877) ; Kirby, *l.c.* p. 630. n. 7 (1892) ; Hamps., *l.c.* p. 112. n. 180 (1892) (Canara).

♂ ♀. End-segment of antenna longer than in *gyrans*. Similar in colour to *M. gyrans*, base of seventh abdominal tergite less pure and less extended white, this belt generally not visible or only indicated, unless the segment is removed ; sides of breast and legs of the dull drab-russet colour of the underside of the abdomen, the latter without white mesial patches ; underside of tail of the same dull tint.

Wings, *above*.——Forewing : antemedian double line prominent, black, close together ; interspace more or less filled up with black ; median interspace grey ; discal lines thin, not prominent, a dark shade on disc between R^1 and M^2.—— Hindwing : base and broad distal border-band blackish umber-brown, median band ochraceous orange or more tawny (too pale in our figure). Forewing varying in length from 16 to 22 mm.

♂. Tenth tergite somewhat rounded at the sides just before the pointed tip ; sternite not black, rather flat, apex rounded. Clasper without friction-scales ; harpe (Pl. L. f. 37) sharply pointed. Penis-sheath (Pl. LVI. f. 20) with two rather broad internal rods ; apical process dentate at proximal edge, long, acute, not dentate at and near base, basally projecting distad.

Early stages not known.

Hab. Ceylon ; S. India.

In the Tring Museum 9 ♂♂, 9 ♀♀ from ; Ceylon ; Nilgiris ; Madras, iv. ; Sangli.

Butler's *vialis* is based on a small individual.

571. **Macroglossum particolor** spec. nov. (Pl. IV. f. 13, ♂).

♂ ♀. Upperside of body and forewing drab-grey ; mesial line of head and thorax russet-brown, a large lateral patch on mesothoracic tegula of the same colour, edged with grey. Abdomen with three orange side-patches, rather small, not separated from one another, the second the largest ; fifth and sixth tergites laterally, seventh mesially, tawny-olive, third and fourth with two blackish basal dorsal spots, not visible if the segments are telescoped too much into one another. *Underside* of palpus greyish white, with a white side-line ; breast grey, shaded with wood-brown ; abdomen wholly wood-brown.

Wings, *upperside*.——Forewing : a broad costal abbreviated subbasal band, separated distally by a thin grey line from a narrower band ; two antemedian lines, oblique, especially the first, interspace filled up with dark scaling ; first and second discal line rather sharply angled behind R^1, first line touching (or almost) second antemedian, the grey median interspace therefore hourglass-shaped or separated into two patches ; second discal line much heavier than first, anterior half of interspace between the two filled up with blackish scaling, this scaling extended distad behind R^1, only separated from the conspicuous subapical dark patch $S(^5$—R^1 by the grey vein R^1, dark apical marginal halfmoon conspicuous, grey costal space proximally of these patches sharply defined, separated by the grey border of the indistinct third discal line into a paler proximal and a slightly darker and sometimes a little rufous distal portion.——Hindwing : base and a broad distal border blackish brown, somewhat olive, median band cadmium-yellow, shaded with tawny along the distal border, especially in ♀.

Underside hazel, shaded with grey, distal border brown, abdominal area of hindwing yellow, sharply limited in front.

End-segment of antenna as long as the five preceding segments together.

♂. Tenth tergite truncate, angles rounded, sternite incrassate at apex and here transversely carinate. Clasper *with* friction-scales; harpe pointed, flat above, free part short (Pl. L. f. 33). Process of penis-sheath (Pl. LVI. f. 44), long, evenly curved, pointing proximad, its distal surface denticulated, a longer subbasal tooth; internal rods flattened, rounded at end.

Length of forewing: ♂, 19 mm.; ♂, 23 mm.

Cremaster of pupa (Pl. LXIV. f. 21) flattened, triangular, bifid, dentate.

Hab. S. India.

In the Tring Museum, 1 pupa, 2 ♂♂, 3 ♀♀ from: Madras (*type*), Oct. and Nov. 1896, Feb. and March 1897 (Watson); Mahé, Deschamps (received from Mons. Chas. Oberthür).

In the collection of Charles Oberthür from Mahé; also in the collection of Monsieur l'Abbé de Joannis.

572. Macroglossum belis.

(?) *Sphinx belis* Linné, *Syst. Nat.* ed. x. p. 493. n. 31 (1758) (hab.?).

Sphinx belis Cramer, *Pap. Exot.* i. p. 147. t. 94. f. *c* (1776) (China).

Sesia stellatarum β., Fabricius, *Spec. Ins.* ii. p. 155. sub n. 6 (1781); Gmel., *Syst. Nat.* i. 5. p. 2387. sub n. 27 (1790).

Macroglossa stellatarum, Walker, *List Lep. Ins. B. M.* viii. p. 86. n. 1 (1856) (partim).

Macroglossa passalus, id. (*non* Drury, 1773), *l.c.* p. 92. n. 12 (1856) (partim).

Macroglossa pyrrhula, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 338. n. 10 (1875) (hab.?).

Macroglossa belis, id., *l.c.* p. 343. n. 17 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 526. n. 17. t 90.f. 6. 7 (*l., p.*) (1877) (=*assimilis* ex err.); Moore, *Journ. As. Soc. Bengal* liii. 2. p. 234. n. 1 (1884) (Cachar); Swinh., *Proc. Zool. Soc. Lond.* p. 287. n. 3 (1885) (Belgaum; Sattara, vi.; Bombay); id., *l.c.* p. 434. n. 3. (1886) (Mhow, vi. ix. xi.); id., *Journ. Bombay N. H. Soc.* iii. p. 117. n. 3 (1888) (Karachi; =*assimilis*= *zena, ex err.!*); id., *Cat. Lep. Het. Mus. Oc.* i. p. 7. n. 23 (1892) (partim); Kirby, *Cat. Lep. Het.* i. p. 630. n. 21 (1892) (partim); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 113. n. 184. fig. 67 (1892) (syn. partim); Dndg., *Journ. Bombay N. H. Soc.* xi. p. 417. n. 184 (1898) (Sikhim & Bhutan, up to 3000 ft., v. vii. ix.); Nurse, *Journ. Bombay N. H. Soc.* xii. p. 513 (1899) (Cutch).

**Macroglossa opis* Boisduval, *l.c.* p. 345. n. 21 (1875) (Silhet: Darjiling;—coll. Charles Oberthür).

♂♀. End-segment of antenna about as long as the five preceding segments together. Abdomen with three cadmium-yellow side-patches, separated from each other, the first smallest, transverse, fifth segment with a lateral, sixth with a dorso-lateral, and seventh with a mesial patch of a dark brown or black colour; tips of side-tufts white; breast and legs russet-wood-brown, middle of prosternum more grey; palpus white, with some brown scales; abdomen beneath clayish cinnamon-rufous, basal sternite and a large indistinct mesial apical patch on each of the two following ones of the colour of the breast.

Wings, *above*.——Forewing: two antemedian lines, slightly converging in front, interspace filled up, but the band not prominent; first and second discal line evenly curved costad in front, the second line heavier than the first, interspace partly filled up with dark scaling, especially in front, the lines straight behind, or incurved; dark subapical patches not prominent, grey costal space at its proximal side sharply limited at R¹.——Hindwing with cadmium-yellow median band, base and distal border blackish brown, the border somewhat shaded off along the yellow band, being here less deep in tint.

Underside hazel-chestnut, rather brighter than abdomen ; abdominal area of hindwing cadmium-yellow.

♂. Tenth segment similar to that of *vacillans*. Clasper *with* friction-scales ; harpe and penis-sheath also not essentially different from that of *vacillans*.

Larva (acc. to Butler) black ; head and a series of lateral stigmatical spots red ; a white dorso-lateral line.

Hab. Ceylon, N.W. India to China and the Loo Choo Islands.

In the Tring Museum 64 specimens from : Ceylon ; South India ; Ajmere ; Dalhousie ; Sikhim ; Bhutan ; Khasia Hills ; Cherrapunji ; Tonkin ; Loo Choo.

A close ally of *M. vacillans*, distinguishable by the absence of a yellow patch from the fourth abdominal segment and the much paler yellow band of the hindwing.

Linné's description of his *belis* is so short that it is impossible to say which species of *Macroglossum* he had before him. Cramer's figure agrees best with the present insect.

The type of *pyrrhula* is not preserved.

573. Macroglossum assimilis.

Macroglossum assimilis Swainson, *Zool. Illustr.* t. 64 (♂, ♀) (1821) (hab. ?).

**Macroglossa gilia* Herrich-Sch., *Ausser. Schm.* i. f. 107 (1854) (Java ;—type now in coll. Standinger).

**Macroglossa bengalensis* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 341. n. 14 (1875) (Pondicheri ;—coll. Charles Oberthür); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 115. n. 138 (1892); Kirby, *Cat. Lep. Het.* i. p. 630. n. 19 (1892) ; Hamps., *Journ. Bombay N. H. Soc.* xiii. p. 40. n. 187 (1900) (= *belia*).

**Macroglossa taxicolor* Moore, *Proc. Zool. Soc. Lond.* p. 387 (1879) (Ceylon ;—Mus. Dublin) ; id., *Lep. Ceylon* ii. p. 29. t. 90. f. 3. 3a (*l., p., i*) (1882) ; Kirby, *l.c.* p. 632. n. 45 (1892).

**Macroglossa belia* Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 114. n. 185 (1892) (Trincomali, ♀ ;—Mns. Brit.) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* ix. p. 58. t. 157. f. 15 (1893).

♂♀. Similar to *belis* ; dark side-patches of fifth and sixth abdominal segments less black, underside of abdomen and wings less reddish ; upperside of forewing with a whitish grey flush, the antemedian band broader behind, dilated basad at hinder margin, first discal line vestigial behind, second strongly angled at R^2, concave between R^2 and hinder margin, interspace between the two lines filled up ; subapical dark spot SC^5—R^1 ovate, *prominent*, nearly black, the grey costal space at its proximal side not sharply limited behind, continuous with the grey submarginal area ; the grey median interspace rather conspicuous ; yellow band of the same colour as in *belis*, *i.e.* deeper in tint than in *corythus* and allies.

♂. Tenth tergite truncate-sinuate ; sternite transversely multicarinate on the upperside, raised in the mesial line, appearing pointed in an apical view, apical half black. Clasper *with* friction-scales ; harpe (Pl. L. f. 38) elongate, spoon-shaped at end, the small widened part dentate. Penis-sheath (Pl. LVI. f. 21) with a long apical process, which is somewhat widened and dentate before end ; from its projecting base proximad extend two series of long teeth on to the sheath ; internal rods obtuse at end.

Larva (acc. to Moore, *l.c.*) brown or green, a dorso-lateral pale line from end of ninth segment to horn, continued frontad by a series of thin brown dashes, or by a vestigial line ; a series of dorsal dots.

Hab. Ceylon ; S. India ; "Java" (acc. to Herrich-Sch.).

In the Tring Museum 9 ♂♂, 8 ♀♀ from : Ceylon ; Nilgiris ; Madras, vi. xi.

Swainson's figures apply to this insect ; the grey tint of the forewing, the

broad antemedian band, the strongly curved second discal line and the prominent ovate subapical spot are well reproduced in the figures. Herrich-Schaeffer's figure is overcoloured.

574. Macroglossum fruhstorferi.

Macroglossa fruhstorferi Huwe, *Berl. Ent. Zeitschr.* xl. p. 357. n. 10. t. 3. f. 4 (♂) (1895) (Java).

♂ ♀. Similar to *calescens*. Underside of palpus and middle of breast blackish grey, speckled with white scales; posterior side-tufts of abdomen tipped with yellowish buff, not white; between the grey postdiscal costal space of forewing and the grey space at internal margin there is a third grey patch, these three forming a band divided by two blackish brown streaks R^2 and M^1, the grey postdiscal line at the outer edge of the upper two grey patches continuous down to M^1 or to hinder margin; hindwing below yellowish in basal area, pale yellow abdominal area ill-defined.

♂. Tenth tergite narrowed apically; sternite longer, slenderer in side-view, broadly rounded at end in dorsal view, not distinctly acuminate. Clasper without friction-scales; harpe (Pl. LI. f. 6) gently curved upwards, tip denticulated. Process of penis-sheath (Pl. LVI. f. 32) short, obtuse, denticulate at and near the proximal edge and at apex.

Hab. Java; Obi.

Two subspecies:

a. M. fruhstorferi fruhstorferi.

Macroglossa fruhstorferi Huwe, *l.c.*

♂ ♀. Grey postdiscal line of forewing interrupted at M^1: the grey area outside the blackish brown discal band divided into three patches; yellow band of hindwing interrupted.

Hab. Java.

In the Tring Museum 1 ♂ from Java.

In coll. Oberthür 1 ♂ from Mt. Gede (Ledru).

b. M. fruhstorferi latifascia subsp. nov. (Pl. VI. f. 6, ♀).

♀. Only one rather worn example known. It belongs, we think, to this species. Differing from Java specimens in the blackish brown discal band of the forewing being broader, in the grey space outside it and the grey postdiscal line not being interrupted, and in the yellow band of the hindwing being much broader, not interrupted (the black basal scaling partly rubbed away in the specimen).

Hab. Laiwui, Obi, September 1897 (W. Doherty), 1 ♀ in the Tring Museum.

575. Macroglossum calescens (Pl. III. f. 5, ♂.

* *Macroglossa calescens* Butler, *Ann. Mag. N. H.* (5). x. p. 156 (1882) (N. Britain; Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 632. n. 47 (1892); Pagenst., in Chun, *Zoologica* xii. 29. p. 18. n. 19 (1900) ("not seen").

♂. Body above and forewing black, with a chestnut tint, especially the former. Head above dark grey with a blackish mesial stripe; a distinct white line above eye; anterior part of thorax speckled with white-tipped scales; two yellow side-patches on abdomen situated on segments 3 and 4, seventh segment with white scales at base, dorsal and ventral basal scales of tail white-tipped,

side-tufts all white-tipped ; palpus and middle of breast white, speckled with black scales, sides of breast, legs, and abdomen maroon-chestnut, middle of abdomen darker brown, shaded with white scaling.

Wings, *above*.——Forewing : antemedian and discal lines filled in, the two bands contiguous except in front; subbasal area, median and postdiscal costal spaces, a space before anal angle, and a submarginal space between R^1 and R^3 filled in with bluish white scales forming lines, the external line of the postdiscal costal patch and the inner line of the submarginal patch continuous with one another : outside the postdiscal whitish space there is a reddish black trapezoidal patch divided by vein SC^5.——Hindwing : yellow band narrow, constricted behind cell, the broad black border being angulate or produced basad.

Underside reddish chestnut on disc, proximal area deep brown, extreme base of both wings slightly yellow, yellow abdominal area of hindwing sharply defined.

♂. Tenth tergite obtuse, less slender than usually in this genus; sternite short, subspatulate, mesially carinate above, apex acuminate. Clasper without friction-scales; harpe (Pl. LI. f. 7) rather long, curved upwards and twisted beyond middle, tip acute. Process of penis-sheath (Pl. LVI. f. 33) very long, ending in a long thin point, base prominent, denticulate, no teeth upon sheath proximally of base of process, proximal edge of latter denticulate, apical margin of sheath triangularly dilated distad at the side opposite the process ; internal rods broad.

Early stages not known.

Hab. New Britain ; New Guinea.

In the Tring Museum 2 ♂♂ from : Milne Bay, British N. Guinea (Meek); Fergusson, d'Entrecasteaux Is. (Meek).

576. **Macroglossum castaneum** spec. nov. (Pl. III. f. 16, ♂).

♂. Only one moderately preserved specimen. Upperside of body brownish black, head and anterior part of thorax olivaceous, posterior abdominal segments somewhat chestnut; two restricted yellow side-patches on abdomen. Underside of palpus grey, much speckled with brown ; breast olivaceous, abdomen burnt-umber colour, chestnut laterally; side-tufts with small white tips.

Wings, *above*.——Forewing brownish black, markings indistinct, except the grey border of the postdiscal line, this convex in middle, concave behind; antemedian and discal brownish black bands appearing merged together, their outlines barely traceable, two subapical brown spots SC^4—R^1 followed by a third spot R^1—R^2. ——Border of hindwing broad, convex, sinuate behind.

Underside bright chestnut ; brown distal borders distinct ; bases yellow : yellow abdominal area of hindwing rather sharply defined, 1½ mm. short of tip of SM^2.

♂. Tenth tergite truncate ; sternite somewhat acuminate, upperside elevate in mesial line. Clasper without friction-scales ; harpe (Pl. L. f. 48) short, obtuse, slightly incrassate, strongly dentate. Penis-sheath *without* process, only with a few teeth (Pl. LVI. f. 48) ; internal rods rounded at end.

Length of forewing : ♂, 21 mm.

Hab. Florida I., Solomon Islands, January 1901 (A. S. Meek and Eichhorn).

1 ♂ in the Tring Museum.

In the structure of the penis-sheath nearest to *alcedo*. The non-interrupted grey postdiscal line of the forewing distinguishes this species easily from *calescens*.

577. Macroglossum pyrrhosticta (Pl. III. f. 12, ♂).

Macroglossa corythus var., Walker, *List Lep. Ins. B. M.* viii. p. 92. n. 14 (1856) (partim).
Macroglossa gilia, Boisduval (*non* Herrich-Sch., 1854), *Spec. Gén. Lép. Hét.* i. p. 341. n. 15 (1875) (partim) ; Moore, *Journ. As. Soc. Bengal* liii. 2. p. 234. n. 3 (1884) (Cachar) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 117. n. 195 (1892) (partim) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 357. n. 5 (1895) (Java) ; Alph., in Rom., *Mém. Lép.* ix. p. 119 (1897) (Szé-tchuen, vi.) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 418. n. 195 (1898) (Sikhim & Bhutan, 2000—5000 ft., vi. vii.)
Macroglossa corythus, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 339. n. 11 (1875) (partim ; ♀).
**Macroglossa pyrrhosticta* Butler, *Proc. Zool. Soc. Lond.* p. 242. n. 11. t. 36. f. 8 (1875) (Shanghai ; —Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 527. n. 24. t. 90 f. 8 (larva) (1877) ; Leech, *Trans. Ent. Soc. Lond.* p. 120. n. 104 (1889) (Kiukiang) ; Semper, *Schmett. Philipp.* ii. p. 406. n. 56 (1896) (Luzon, viii.).
**Macroglossa catapyrrha* Butler, *Proc. Zool. Soc. Lond.* p. 243. n. 13. t. 36. f. 6 (1875) (N. India ; —Mus. Brit.) ; id. *Trans. Zool. Soc. Lond.* ix. p. 528. n. 28 (1877) (partim) ; Kirby, *Cat. Lep. Het.* i. p. 631. n. 34 (1892).

♂♀. Very close to *troglodytus*, larger, the antemedian band and the first discal line of the forewing generally wider apart, all the grey interspaces more olivaceous, duller than in *troglodytus*, and not so prominent, the wing appearing less variegated, though the number of lines and interspaces is the same in both species. Underside as bright ferruginous as in *troglodytus*, abdomen very often with two rows of blackish patches as in many specimens of *troglodytus*. Underside of palpus and middle of breast rather variable in tint.

♂. Sexual armature as in *troglodytus*, but the upper lobe of the harpe *acuminate*, without teeth at the upper edge or only with a few (Pl. LI. f. 13. 14), and the process of the penis-sheath longer and pointed (Pl. LVI. f. 36).

Larva (fig. by Butler, *l.c.*) : greenish white, anterior segments green ; a white dorsal and a dorso-lateral line edged with green ; thin green side-bands.

Hab. North India to Japan, eastwards to Lombok. A common species ; apparently not occurring in South India and Ceylon.

The bright ferruginous underside distinguishes it easily from *variegatum* and *heliophila*.

In the Tring Museum 100-odd specimens from : North India ; Annam ; Tonkin ; China ; Japan ; Loo Choo Is. ; Lombok.

578. Macroglossum troglodytus (Pl. III. f 11, ♂).

Macroglossa sitiene Walker, *List Lep. Ins. B. M.* viii. p. 92. n. 13 (1856) (partim).
Macroglossa corythus var., id., *l.c.* n. 14 (1856) (partim).
**Macroglossa troglodytus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 344. n. 19 (1875) (Assam ; Darjiling ;—coll. Charles Oberthür).
(*f*) *Macroglossa gilia*, Röber, *Tijdschr. Ent.* xxxiv. p. 323 (1891) (Flores).
Macroglossa belis, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p 113. n. 181 (1892) (sub. syn).
Macroglossa gilia, id., *l.c.*, p. 117. n. 195 (1892) (partim) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* ix. p. 59. t. 175. f. 6 (larva) (1893) (this species?).
Macroglossa belis var. *troglodytes*, id., *l.c.* p. 58. t. 157. f. 6 (1893) (Ceylon).

♂♀. A small species, generally confounded with *insipida*. Forewing much variegated with slaty grey, the lines rather prominent, the antemedian band oblique, not always completely filled in with black, often touching first discal line ; second discal line heavy, dilated distad behind R^4. Underside of abdomen and disc of wings ferruginous ; bases of wings more or less shaded with yellow ; palpus dirty grey, middle of breast vinaceous olive. There are probably several subspecies.

South Indian and Ceylonese specimens have the yellow band of the hindwing deep in tint, Chinese ones have it pale, and the former possess rather heavier antennae.

♂. Tenth tergite sulcate beneath, convex above, truncate-rounded; sternite rather flat, apex rounded, feebly acuminate in middle, transversely carinate above. Clasper without friction-scales; harpe forked like that of *pyrrhosticta*, but upper lobe flat, rounded in dorsal view (Pl. L. f. 15), dentate at edges, lower lobe clubbed, tuberculose. Process of penis-sheath (Pl. LVI. f. 37) obtuse, dentate at apex, basal dentition extending on to the sheath, the most proximal tooth enlarged; internal rods broad, rounded at end, sharp side-edge denticulate.

The larva figured by Hampson may belong to this species.

Hab. Ceylon to China, eastwards to Java; probably all over the Indo-Malayan Subregion.

In the Tring Museum 44 specimens from: Ceylon; South and North India; China; Java.

579. **Macroglossum insipida** (Pl. III. f. 9. 10. 17, ♂♂).

**Macroglossa insipida* Butler, *Proc. Zool. Soc. Lond.* p. 242. n. 12 (1875) (Ceylon;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 527. n. 25 (1877).

♂♀. Very close to *troglodytus*, with which it agrees in size. Antemedian band of forewing above rather suddenly narrowed in anterior half and curved costad, being less oblique than in *troglodytus*.

♂. Harpe quite different from that of *troglodytus* and *pyrrhosticta*, resembling that of *faro*; cylindrical, a little curved upwards at end, tip denticulate (Pl. LI. f. 16). Process of penis-sheath (Pl. LVI. f. 38) obtuse, dentate at end and at proximal edge, dentition extending on to the sheath in one row, proximal tooth enlarged, triangular, except *poecilum*.

Larva (adult) brown, with a dark dorsal line throughout, and thin side-bands, a subdorsal reddish line, interrupted except on thorax; this line yellow in green form of larva, and white in young larva.

Hab. Ceylon to the Loo Choo Islands, eastwards to Australia.

Three subspecies, perhaps four:

a. M. insipida insipida (Pl. III. f. 10, ♂).

**Macroglossa insipida* Butler, *l.c.*; Moore, *Lep. Ceylon* ii. p. 30. t. 92. f. 3. 3a. 3b (*l., p., i.*) (1882); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 4. n. 14 (1892) (Ceylon); Kirby, *Cat. Lep. Het.* i. p. 631. n. 35 (1892); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 117. n. 194 (1892) (partim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 418. n. 194 (1898) (larva & pupa descr.).

**Macroglossa limata* Swinhoe, *l.c.* p. 4. n. 15. t. 1. f. 1 (♂) (1892) (Java).

♂♀. Distal margin of forewing more convex and apex less acute than in *troglodytus*. Penis-sheath with very few teeth proximally of base of process, but the most proximal one large, triangular (Pl. LVI. f. 38).

Hab. Ceylon to North India, eastwards to Borneo and Java.

In the Tring Museum 40-odd specimens from: Ceylon; South and North India; Andamans; Penang; Borneo; Java.

The specimens from the various places present some slight differences which may prove local, the Malayan individuals forming perhaps a separate subspecies.

b. M. insipida papuanum subsp. nov. (Pl. III. f. 9, ♂).

♂♀. Darker than western examples; the two yellow patches of the abdomen obviously larger.

Hab. D'Entrecasteaux Is. ; Louisiade Archipelago ; Queensland ; Mysol. Probably on all the Papuan Islands.

In the Tring Museum 13 ♂♂, 13 ♀♀ from : Fergusson (*type*), d'Entrecasteaux Is. (Meek) ; Sudest, iv. (Meek); St. Aignan, viii. (Meek) ; Queensland (Weiske) ; Mysol, i. (Kühn).

c. M. insipida poecilum subsp. nov. (Pl. III. f. 17, ♂).

♂. Perhaps distinct. Resembling in size and in shape of the forewing large specimens of *M. troglodytus*. Body and wings with a reddish flush on upperside. Subapical spot SC^4—SC^5 of forewing dark rufous, dark dorsal geminate spots of abdomen rather prominent, yellow side-spots reduced. Teeth on penis-sheath near base of process more numerous than in the preceding forms, the proximal tooth not much enlarged, being much smaller than in either *papuanum* or *insipida*.

Hab. Loo Choo Islands.

Two ♂♂ in the Tring Museum from : Loo Choo Is. (*type*) ; Okinawa, 12. vii. 1891 (Dr. Fritze).

The abdomen of these two examples has no black patches beneath.

M. insipida, *pyrrhosticta* and *troglodytus* are so similar in colour that it is difficult to distinguish them from one another ; the ♂♂ can be recognised by the sexual armature, but the ♀♀, especially if not in good condition, are sometimes impossible to name with certainty.

580. **Macroglossum alcedo** (Pl. III. f. 8, ♂).

**Macroglossum alcedo* Boisduval, *Voy. Astrolabe, Lép.* p. 188. n. 2 (1832) (Dorey;—coll. Charles Oberthür) : id., *Spec. Gén. Lép. Hét.* i. p. 347. n. 24 (1875).

♂♀. In colour and pattern closely resembling *ungues*, antemedian band of forewing less distinct, grey postdiscal line distinct only in front, the marginal band of the hindwing obviously broader, angulate near M^1, not evenly convex, underside of wings brighter chestnut, with the darker brown distal border more distinct.

♂. Clasper without friction-scales ; harpe (Pl. L. f. 47) short, recurved at end, this part dilated, concave, densely denticulate. Penis-sheath (Pl. LVI. f. 39) with the internal rods rounded at end ; *no proccss*, it being replaced by a short longitudinal dentate ridge.

Hab. Queensland ; Key ; N. Guinea.

In the Tring Museum 7 ♂♂ from : North Queensland (Weiske) ; Little Key, January to March 1895 (Webster).

The type of *alcedo* is in bad condition ; it is a ♀ and belongs apparently here and not to the following species. The distal border of the hindwing is, however, rather too narrow, approaching that of *ungues*. Nobody will be able, we think, to prove that Boisduval's *alcedo* is not the species here figured as such.

581. **Macroglossum ungues** spec. nov. (Pl. III. f. 7, ♂, *type*, Burn).

**Macroglossa gilia*, Pagenstecher (*non* Herrich-Sch., 1854), *Jahrb. Nass. Ver. Nat.* xxxvii. p. 210 (1884) (Amboina) ; id., *l.c.* xli. p. 109. n. 213 (1888) (Amboina) ; Semp., *Schm. Philipp.* ii. p. 406. n. 55 (1896) (Luzon v. vi.).

♂♀. A smaller species than *sitiene*, but nearly identical with it in pattern. Forewing more obtuse, outer margin more convex, first discal line more curved, nearer the antemedian band in middle, subapical spot SC^4—SC^5 more prominent ; hindwing below more washed with yellow in basal area. Antenna of ♂ comparatively longer and stouter.

♂. Harpe longer (Pl. LI. f. 11) than in *sitiene*. Penis-sheath (Pl. LVI. f. 51) with two processes: the upper much longer than in *sitiene*, the lower shorter, the latter dentate.

Hab. Java, Philippines, eastwards to the Moluccas and Sumba.

In the Tring Museum 16 ♂♂, 22 ♀♀ from: Java (Piepers); Bali, iii. iv. (Doherty); Lombok, iv. (Fruhstorfer); Sumba; Dongala, Palos Bay, Celebes, vii. ix. (Doherty); Amboina, ii. viii. (Doherty); Buru, iii. (Doherty); Philippines.

It is possible that further material of *Macroglossum* from the larger Sunda Islands will prove *ungues* and *sitiene* to be forms of the same species. The ♂♂ from the Philippines which we have been able to dissect belong all to *ungues*, but some of the ♀♀ are apparently not different from *sitiene*, being rather larger and more greyish on the forewing than *ungues*.

582. **Macroglossum sitiene** (Pl. III. f. 18, ♂).

**Macroglossa sitiene* Walker, *List Lep. Ins. B. M.* viii. p. 92. n. 13 (1856) (partim; "Natal" err. loc.; Silhet; Moulmein;—Mus. Brit.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 527. n. 23 (1877) (Silhet); Swinh., *Cat. Lep. Het.* i. p. 4. n. 16 (1892) (Siam; Silhet); Kirby, *Cat. Lep. Het.* i. p. 630. n. 22 (1892); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 115. n. 189 (1892) (partim = *nigrifasciata* = *orientalis*); Semper, *Schmett. Philipp.* ii. p. 406. n. 57 (1896) (Luzon, vii., partim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 418. n. 189 (1898) (Sikhim, x.).

**Macroglossa sinica* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 340. n. 12 (1875) (Hongkong;—coll. Charles Oberthür).

Macroglossa sitiens id., *l.c.* p. 343. n. 18 (1875) (partim); Kirby, *l.c.* n. 631. n. 41 (1892).

**Macroglossa nigrifasciata* Butler, *Proc. Zool. Soc. Lond.* p. 241. n. 8. t. 37. f. 3 (1875) (Ceylon;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 526. n. 16 (1877); Moore, *Lep. Ceylon* ii. p. 28. t. 92. f. 1 (1882); Kirby, *Cat. Lep. Het.* i. p. 631. n. 38 (1892).

**Macroglossa orientalis* Butler, *l.c.* ix. p. 528. n. 30 (1877) (Moulmein;—Mus. Brit.); Moore, *Proc. Zool. Soc. Lond.* p. 844 (1878) (Ahsown, Upp. Tenass.); Swinh., *Trans. Ent. Soc. Lond.* p. 162. n. 5 (1890) (Tenasserim); Kirby, *l.c.* n. 33 (1892).

♂♀. Body above and forewing paler than in *heliophila*, clayish; dorsal basal dots of abdominal tergites vestigial, seventh segment pale, with a very conspicuous black mesial patch; side-tufts all prominently tipped with white; underside of palpus, middle of breast and mesial patches on the proximal abdominal sternites or on all, dirty grey, much less white than in *heliophila*. Antemedian band of forewing very prominent, sharply dilated basad behind; first and second discal line curved as in *heliophila*, but the second not dilated distad behind R^1. Yellow band of hindwing deeper yellow than in *heliophila*, edge of black border less convex. Underside rather more greyish distally; lines of hindwing prominent.

♂. Tenth tergite prismatical, rounded above, sulcate below, tip truncate; sternite rounded at end. Clasper *with* friction-scales; harpe (Pl. LI. f. 12) almost straight, sharply pointed. Penis-sheath (Pl. LVI. f. 52) with two processes: one (*a*) broad, hook-shaped, dentate at the concave edge; the other (*b*) very slender and long, horizontal; long internal rod broad, terminating in a long point.

Hab. Ceylon to the Philippines.

In the Tring Museum 5 ♂♂, 7 ♀♀ from: Ceylon; Nilgiris; Manila.

583. **Macroglossum stigma** spec. nov. (Pl. IV. f. 15, ♀).

♀. Head and thorax with dark middle line; mesothoracic tegula with large blackish area, anteriorly bordered by an oblique greyish line; abdomen with one yellow side-patch, situated on third segment, seventh tergite with two conspicuous white basal spots, black in middle: anal tuft blackish brown, all side-tufts tipped

with white ; underside of palpus, middle of breast, mesial patches of abdominal segments greyish white, sides of breast, legs, and abdomen deep brown.

Wings, *above*.——Forewing : two antemedian lines filled in with black, this band broad, slightly curved, dilated basad behind, basal area shaded with vinaceous grey, median area also vinaceous grey, with a prominent black stigma ; first and second discal line slightly concave at M^1, gently curved costad in front, first very weak, just proximal of fork SC^{4+5}, obliterated behind, second prominent, more distal than in other species, crossing SC^5 2 mm. distally from fork SC^{4+5} and reaching hinder margin about 2 mm. from angle, being only $1\frac{1}{2}$ mm. distant from the prominent oblong subapical spot SC^5—R^1, and being contignous with the postdiscal line between R^1 and M^1.——Hindwing : black border very broad, strongly angulate at M^2, the yellow colour not extending beyond C.

Underside blackish mummy-brown, a few greyish scales in submarginal region; hindwing with the first discal line almost obliterated, the second distinct, the third close to it, vestigial ; yellow abdominal area reduced, not sharply defined, extending about halfway to end of SM^2.

Length of forewing : ♀, 26 mm.

Hab. Dorey, Dutch N. Guinea, April 1897 (W. Doherty), 1 ♀ in the Tring Museum.

The distal position of the second discal line of the forewing distinguishes this species easily from *sitiene*, *heliophila* and others, besides the stigma of the forewing and the white spots on the seventh abdominal tergite.

584. **Macroglossum heliophila** (Pl. III. f. 6, ♂).

**Macroglossa heliophila* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 354. n. 36. t. 11. f. 2 (1875) (Halmahera; —coll. Charles Oberthür) ; Kirby, *Cat. Lep. Het.* i. p. 631. n. 23 (1892).

**Macroglossa fringilla* Boisduval, *l.c.* p. 352. n. 33 (1875) (India ;—Mus. Paris) ; Kirby, *l.c.* p. 632 n. 60 (1892).

Macroglossa nigrifasciata, Butler (*non* id., 1875) ; *Proc. Zool. Soc. Lond.* p. 670. n. 31 (1880) (Formosa).

**Macroglossa kanita* Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 5. n. 17. t. 1. f. 2 (1892) (Sumatra ;— Mus. Oxford).

**Macroglossa loochooana* Rothschild, Nov. Zool. i. p. 67 (1894) (Loo Choo Islands ;—Mus. Tring).

(?) *Macroglossa divergens*, Huwe (*non* Walker, 1856), *Berl. Ent. Zeitschr.* xl. p. 357. n. 4 (1895) (Java).

♂ ♀. Head and thorax with a prominent dark mesial stripe ; a rather sharply marked triangular area on mesothoracic tegula the same colour ; abdomen with a pair of prominent black dorsal basal spots on fourth tergite ; side-tufts all tipped with white ; underside of palpus, middle of breast, and a mesial patch on first abdominal sternites greyish white, rest of abdomen dull burnt-umber-brown ; tail rather darker.

Wings, *upperside*.——Forewing : two antemedian lines filled in, forming a very prominent band which is nearly straight distally and dilated basad at hinder margin ; first and second discal lines curved costad in front, concave between R^1 and hinder margin, the first thin, the second heavier, interspace not quite filled in, the lines remaining quite distinct, the second dilated distad behind R^1 till reaching postdiscal line, this spot-like dilatation prominent, R^1 in front of it grey, bordering a sharply defined postdiscal costal grey patch, subapical spot SC^5—R^1 prominent, while the space SC^1—SC^5 in front of it is more or less grey.——Black border of hindwing convex, more or less angulated near M^1.

Underside like abdomen, basal central area of forewing darker, distal border

duller, darker brown; bases shaded with yellowish buff, yellow abdominal area sharply defined, about 1½ mm. short of tip of SM^2.

♂. Tenth tergite rather broad, rounded-truncate, flattened at end; sternite spatulate, upperside elevated in mesial line, apical margin acuminate. Clasper *with* friction-scales; harpe (Pl. LI. f. 4) incrassate distally, obtuse; often with a subapical lateral tuberculated hump, as in f. 3. Penis-sheath almost exactly as in *melas* (Pl. LVI. f. 31), but the teeth near the base of the process larger.

Hab. South India to the Loo Choo Islands, eastwards to the Moluccas.

In the Tring Museum 13 ♂♂, 14 ♀♀ from: Nilgiris; Tonkin; Hongkong: Loo Choo Is.; Formosa; Java; Sarawak; Philippines; Batjan.

It is possible that there are at least two subspecies; but the material in collections, especially from the Moluccas, is not yet large enough to allow us to form a definite opinion.

The white underside of the palpi and of the middle of the breast distinguishes *heliophila* at a glance from *sitiene* and *variegatum*, while the less black colour of the body and wings separates it from *melas*.

585. **Macroglossum melas** spec. nov. (Pl. III. f. 19, ♀).

♂♀. Similar to *M. heliophila*, but body and wings much deeper in tint, almost black above and below; yellow spots of abdomen small, fourth and fifth tergite with a pair of black basal spots above; underside of palpus, middle of breast and mesial patches of abdomen white, side-tufts of abdomen tipped with white. A thin white line above eye. Pattern of forewing as in *heliophila*, individually somewhat variable, pale median interspace less prominent and less vinaceous. Black border of hindwing broader than in *heliophila*, angulate between R^3 and M^2, the yellow band here constricted or interrupted. Wings *below* grey at extreme base; yellow area of hindwing restricted, about 3 mm. short of tip of SM^2.

♂. Sexual armature not essentially different from that of *heliophila*, harpe slenderer (Pl. LI. f. 3. 5), dentition at the base of the penis-sheath not quite so heavy (Pl. LVI. f. 31).

Hab. Key Islands; N. Guinea; Woodlark I.; Queensland.

In the Tring Museum 3 ♂♂, 6 ♀♀ from: Little Key (*type*, H. Kühn), Dec. and Jan.; Milne Bay, Brit. N. Guinea, Jan. and Feb. (A. S. Meek); Woodlark (A. S. Meek); Queensland (Weiske).

This may be the Papuan representative of *heliophila*. Further material is necessary to decide the question.

586. **Macroglossum divergens.**

**Macroglossa divergens* Walker, *List Lep. Ins. B. M.* viii. p. 94. n. 17 (1856) (Ceylon;—Mus. Brit.) Butl., *Trans. Zool. Soc. Lond.* ix. p. 528. n. 31 (1877) ("Canara" alia spec.); Moore, *Lep. Ceylon* ii. p. 27. t. 92. f. 2 (1882); Kirby, *Cat. Lep. Het.* i. p. 630. n. 18 (1892); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 117. n. 196 (1892) (Ceylon).

♀. Only one specimen known. It may be an extreme variety of *heliophila*.—— Forewing, *above*: first discal line vestigial, second heavy and dilated distad between R^1 and R^2; a distinct black line outside the grey postdiscal line as broad as the second discal one.

Hab. Ceylon.

In the British Museum 1 ♀ (*type*).

587. **Macroglossum mediovitta** spec. nov. (Pl. IV. f. 16, ♂).

♂. Differs from *heliophila* in the following points:——Forewing more elongate, distal margin less convex, proximal edge of antemedian band not distinct, the basal area being darker than in *heliophila*; pinkish white median band very prominent, more oblique, sharply defined, the first discal line being well marked, forming the discal border of the white band, the line not elbowed anteriorly, second discal line scarcely visible, the disc outside the white band being so deep brown that the line is obscured, the blackish brown area gradually shading off distally: no sharply defined postmedian costal grey space, R^1 not grey, subapical spot SC^5—R^1 small, grey postdiscal line vestigial.——Hindwing: distal border evenly convex, narrower than in *heliophila*.——Structure of genital armature of ♂ as in *heliophila*.

Hab. Loo Choo Islands: Okinawa.

In the Tring Museum 3 ♂♂ collected by Dr. A. Fritze on Okinawa in July and August 1891. Also in the British Museum.

588. **Macroglossum albigutta** spec. nov. (Pl. III. f. 3, ♀).

♀. A very dark-coloured species. Abdomen with two prominent white basal spots on seventh tergite, side-tufts of sixth and seventh segments brownish black or burnt-umber-brown; seventh sternite with white mesial dot or line. Underside of palpi and middle of breast greyish white, sides of breast dark brown. White line above eye distinct.

Wings, *upperside*.—Forewing: a white or grey, narrow, straight, median band as in *M. hirundo hirundo*, the olive-black band at its proximal side dilated basad at hinder margin, not sharply defined proximally; the discal band at the distal side of the median white band broad, ill-defined distally, dilated distad between R^1 and R^3, thus joined to a rather broad postdiscal band which extends from the two subapical patches SM^4—R^1 to hinder margin, bordered proximally by a grey line which is interrupted between R^1 and R^3, area outside this band slightly greyish like the postmedian costal space and the basal area.——Hindwing: distal border convex, broader than yellow band, this interrupted or entire.

Wings *below* dark mummy-brown, or Mars-brown, with the distal borders darker, lines quite indistinct, third the best marked; abdominal area of hindwing yellow, sharply defined.

Length of forewing: ♀, 23 to 25 mm.

Hab. Solomon Islands: Guadalcanar and Florida.

Two subspecies:

a. M. albigutta albigutta (Pl. III. f. 3, ♀).

♀. White median band of forewing very prominent. Yellow band of hindwing broadly interrupted. Underside of wings deep mummy-brown. Abdomen with a yellow side-patch on segment 3, and a few yellow scales on segments 2 and 4; seventh sternite with a white mesial dot.

Length of forewing: 23 mm.

Hab. Guadalcanar.

In the Tring Museum 1 ♀, March 1901 (A. S. Meek).

b. M. albigutta floridense subsp. nov.

♀. Median band of forewing less distinct. Yellow band of hindwing not interrupted. Abdomen above and underside of wings Mars-brown. Abdomen with

the yellow side-patch of segment 4 as large as that on 3 ; seventh sternite with white mesial line, the other sternites with more or less distinct white mesial dots.

Length of forewing : 25 mm.

Hab. Florida Island.

In the Tring Museum 1 ♀, 2. i. 1901 (A. S. Meek).

589. Macroglossum dohertyi.

**Macroglossa dohertyi* Rothschild, Nov. Zool. i. p. 67. t. 5. f. 2 (♂) (1894) (Amboina ;—Mus. Tring).

♂. In this remarkable insect the median interspace and the grey postdiscal line of the forewing of the other *Macroglossum* have developed into two narrow, sharply-defined, buffish white bands. Tenth tergite rounded-truncate ; sternite narrowed towards the end, which is rounded. Clasper with rather large friction-scales ; harpe rather broad, compressed, subacuminate, upper edge denticulate distally (Pl. L. f. 31). Process of penis-sheath (Pl. LVI. f. 49) short, obtuse, densely denticulate at the proximal edge and at end ; internal rods rounded at end.

Hab. Amboina and New Guinea.

In the Tring Museum 2 ♂♂ from : Amboina, February 1892 (W. Doherty, *type*) ; British New Guinea.

590. Macroglossum hirundo.

**Macroglossa hirundo* Boisduval, *Voy. Astrolabe, Lép.* p. 184 (1832) ; id., *Spec. Gén. Lép. Hét.* i. p. 346. n. 23. t. 9. f. 4 (1875) (Tahiti :—coll. Charles Oberthür).

♂♀. A geographically and individually variable species. The median interspace of the forewing grey, generally prominent, straight, sometimes separated into two patches ; first and second discal lines not or feebly curved costad, not obviously elbowed, more or less concave. Yellow abdominal area of hindwing below sharply defined.

♂. Tenth tergite compressed, pointed ; sternite rounded at end. Clasper with friction-scales ; harpe (Pl. LI. f. 8) broad, flattened, more or less rounded at end, apex densely denticulated. Process of penis-sheath (Pl. LVI. f. 27) horizontal, slender, dentition variable, no teeth upon sheath near base of process, except in *lifuensis* ; internal rods rounded at end, the longer one dentate at one edge.

Hab. Papuan Subregion : Key to Tahiti and Fiji.

Five subspecies :

a. M. hirundo hirundo.

**Macroglossa hirundo* Boisduval, in *Voy. Astrolabe, Lép.* p. 184 (1832) (Taiti ;—coll. Charles Oberthür) ; id., *Spec. Gén. Lép. Hét.* i. p. 346. n. 23. t. 9. f. 4 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 529. n. 37 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 632. n. 58 (1892).

♂♀. The yellow area of the hindwing is far too broad in Boisduval's figure, the base of the wing being black in Tahiti specimens, not yellow. Grey median band of forewing very narrow, oblique, being a little more distal at hinder than at costal margin, the dark lines and bands indistinct, grey border of postdiscal line and a grey submarginal shade extending from apex to near hinder margin distinct, less regular than in Boisduval's figure. Yellow band of hindwing rather broader than the basal black area. Abdomen with a small

transverse yellow side-mark on second segment, spots on third and fourth larger. Underside of body and wings Mars-brown. Harpe spatulate, dilated part rather deeply concave.

Hab. Tahiti.

1 ♂ and 1 ♀ in coll. Charles Oberthür ; 1 ♂ in Mus. Paris.

b. M. hirundo vitiense subsp. nov.

(?) *Macroglossa* spec., Druce, *Proc. Zool. Soc. Lond.* p. 220. n. 2 (1888) (Fiji).

♂. Like the preceding, but yellow side-patch on fourth abdominal segment vestigial or absent, grey median band of forewing not distinct, yellow band of hindwing narrower in middle than black basal area.

Hab. Fiji.

In the Tring Museum 2 ♂♂ from Fiji.

c. M. hirundo lifuensis.

**Macroglossa lifuensis* Rothschild, Nov. Zool. i. p. 67 (1894) (Lifu ;—Mus. Tring).

♂♀. One yellow side-spot on abdomen, situated on segment 3 ; black side-patches on segments 4 and 5 prominent. Antemedian and discal dark bands of forewing conspicuous, the discal one somewhat curved costad in front, postdiscal line distinct, dentate, with a distinct grey border, subapical patches SC^1—R^1 distinct, the second darker, rounded ; grey median band variable. Yellow band of hindwing somewhat deeper yellow than in *errans*, and narrow, almost as broad as in *hirundo hirundo*.

Underside of wings as in *hir. hirundo*, much more rufous than in *errans*. Process of penis-sheath more densely denticulate basally, the dentition extending on to the sheath. Harpe much more elongate, less spatulate, than in the other subspecies, almost pointed.

Hab. Lifu, Loyalty Is., and New Caledonia.

In the Tring Museum 3 ♂♂, 1 ♀ from Lifu and N. Caledonia.

d. M. hirundo errans.

**Macroglossa errans* Walker, *List Lep. Ins. B. M.* viii. p. 96. n. 21 (1856) (Australia ; Moreton Bay ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 352. n. 32 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 529. n. 38 (1877) (*type* from Moreton B., with white band, *ex errore* !) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 6. n. 4 (1891) (Brisbane ; Rockhampton ; Bowen) ; Kirby, *Cat. Lep. Het.* i. p. 632. n. 59 (1892) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 7. n. 27 (1892).

**Rhamphoschisma scottiarum* Felder, *Reise Novara, Lep.* t. 75. f. 8 (1874) (Australia ;—Mus. Tring) ; Boisd., *l.c.* p. 354. n. 35 (1875) ; Butl., *l.c.* p. 529. n. 35 (1877).

**Macroglossa belinda* Pagenstecher, in Chun, *Zoologica* x. 29. p. 19. n. 22 (1900) (N. Pommern, ♀ ; —Mus. Tring).

♂♀. The distribution of this subspecies is extensive ; the area occupied includes the Solomon Islands and the Bismarck Archipelago. We cannot find any difference between the few individuals from those localities and Queensland examples. Pagenstecher's *belinda*, of which we have the *type*, must sink as a synonym. *M. errans* is very variable as regards some of the markings, but the prominent grey flush is always present upon the upperside of the forewing and abdomen ; the dark dorsal spots of the latter are well marked, the yellow band of the hindwing is broad, with the outer edge straight, the denticulate postdiscal grey-bordered line of the forewing is conspicuous, the triangular area of the mesothoracic tegula bordered in front by an oblique line is more or less obviously russet, always well

circumscribed. The abdomen has generally only one yellow patch, on segment 3; sometimes there is another vestigial on segment 2, and seldom a third on the fourth segment. The grey median band of the forewing is often interrupted, seldom completely obliterated in consequence of the extension of the brown antemedian and discal bands.

Hab. Queensland, Solomon Islands and Bismarck Archipelago.

In the Tring Museum 6 larvae, 80-odd specimens from: Queensland; Kinigunang (*type* of *belinda*); Guadalcanar, v. (Meek).

c. M. hirundo cinerascens.

**Macroglossa cinerascens* Butler, *Mem. Nat. Acad. Sci. Rep. Eclipse Exp.* p. 94 (1884) (Caroline Is.;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 632. n. 48 (1892).

♂♀. Thorax above and forewing with a peculiar opalescent gloss, except an externo-marginal band of the latter 5 mm. broad in front, tapering behind.

Hab. Caroline Islands; in the British Museum.

From Palisa, Caroline Is., in the Vienna Museum.

591. **Macroglossum rectans** spec. nov. (Pl. IV. f. 8, ♂).

♂. Less grey than *errans*; a small transverse yellow side-mark on second abdominal segment, a large one on the two following; side-tufts of segments 5 and 6 not white, but tawny-ochraceous. Grey median band of forewing as oblique as in *hir. hirundo*, narrow, quite straight, subapical spot SC^5—R^1 small. Yellow band of hindwing narrowing costad, much narrower than in *errans*, at R^2 about half the width of the black distal border, which is distinctly convex from C^1 to SM^2. Underside of wings more rufous than in *errans*.

Hab. Kei Islands and N. Guinea.

In the Tring Museum 2 ♂♂ from: Little Kei, 9. ii. '97 (H. Kühn, *type*): Samarai, Brit. N. Guinea. In the British Museum from Queensland.

592. **Macroglossum prometheus** (Pl. IV. f. 3, ♀).

Macroglossa corythus Walker, *l.c.* viii. p. 92. n. 14 (1856) (partim; Java).

Macroglossum arcuatum Moore, in Horsf. & Moore, *Cat. Lep. Ins. E. I. C.* i. p. 262. n. 599 (1857) (partim; *nom. nud.*).

**Macroglossa divergens*, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 355. n. 37 (1875) (Java).

**Macroglossa prometheus* id., *l.c.* (1875) (Java;—coll. Charles Oberthür).

♂♀. Boisduval's description gives the essential characters. Mesothoracic tegula with grey fringe in fresh specimens. Abdomen above with two dark dots at the bases of segments 3 and 4; anal tuft dark, tip often paler, vinaceous, not yellow or tawny. Grey streak R^1 of forewing, upperside, distinct, grey costal space in front of it prominent, black apical halfmoon joined to the submarginal patch SC^5—R^1, which is black distally and somewhat russet proximally, subapical patch SC^4—SC^5 russet; lines not prominent, the interspaces grey, the median interspace not more grey than the interspace between the subbasal and the double antemedian lines. Yellow band of hindwing very sharply defined, costal margin not yellow. Underside of wings vandyke-brown, shaded with drab, dull in tint, yellow abdominal area contrasting sharply.——See p. 660 for nomenclature.

♂. Tenth tergite as in *glaucoptera*, rather more flattened at tip and less truncate-sinuate. Friction-scales of clasper prominent; harpe (Pl. L. f. 43, 45)

with a very short triangular, acuminate, free process. Process of penis-sheath different in the two subspecies ; no teeth upon the sheath near the base of the process.

Hab. Ceylon to Australia (not in N. India and China ?).

Two subspecies :

a. M. prometheus prometheus.

Macroglossa corythus Walker, *l.c.* (1856) (partim) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 527. n. 26 (1877) (Java) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 7. n. 25 (1892) (Java) ; Kirby, *Cat. Lep. Het.* i. p. 631. n. 28 (1892) (partim).

Macroglossum arcuatum Moore, *l.c.* (*nom. nud.*).

Macroglossa divergens, Boisduval (*non* Walker, 1856), *l.c.*

**Macroglossa prometheus* id., *l.c.* (Java).

(?) *Macroglossa catapyrrha*, Huwe (*non* Butler, 1875), *Berl. Ent. Zeitschr.* xl. p. 357. n. 9 (1895) (Java).

**Macroglossa passalus*, Semper (*non* Drury, 1773), *Schm. Philipp.* ii. p. 406. n. 58 (1896) (partim).

♂ ♀. The prominent grey costal subapical patch of the forewing, with the grey streak R^1 behind, and the sharply defined distal border of the hindwing, distinguish this western form easily from all the species with which it occurs together.

♂. Process of penis-sheath (Pl. LVI. f. 23) with a single basal tooth which points distad, and a number of teeth at and near the proximal edge.

Hab. Ceylon to Java and the Philippines.

In the Tring Museum 6 ♂♂, 17 ♀♀ from : Ceylon ; Malay Pen. ; Penang (Curtis) ; Nias ; Java ; Borneo.

b. M. prometheus inusitata.

Macroglossa approximata, Miskin (*non* Walker, 1864), *Proc. Roy. Soc. Queensld.* viii. p. 7. n. 5 (1891) (Cardwell).

Macroglossa approximans Lucas, *Queenslander* xxxix. p. 834 (May 1891) (abdomen *only* !) ; Misk., *l.c.* 64 (1891).

Macroglossa lineata Lucas, *l.c.* (1891) (abdomen excepted ; Mackay).

**Macroglossa inusitata* Swinhoe, *Cat. Lep. Het. Ox.* i. p. 6. n. 20 (1892) (Dorey, ♀ ;—Mus. Oxford).

**Macroglossa inconspicua* Rothschild, Nov. Zool. i. p. 68 (1894) (N. Guinea ;—Mus. Tring).

♂ ♀. On the whole smaller than the preceding ; distal margin of forewing shorter ; underside of body and wings more grey, middle of breast more whitish ; grey colour of upperside of forewing also more prominent, the antemedian lines resp. band mostly less oblique, often contignous in middle with the first discal line, grey postdiscal line at the distal side of the grey subapical costal patch prominent, dentate at SC^5, the double patch distally of this line more rufous.

Width of marginal band of hindwing fairly constant in Queensland examples ; the band rather narrower in the individuals from the Louisiade Archipelago and the d'Entrecasteaux Islands.

♂. Process of penis-sheath (Pl. LVI. f. 25) variable in dentition, sometimes multidentate upon the surface and at the distal (not proximal) edge, sometimes only with a few prominent basal teeth at the distal edge. Harpe (Pl. L. f. 45) shorter than in the preceding subspecies.

Hab. Queensland ; N. Guinea and the islands near its south-eastern end.

In the Tring Museum 14 ♂♂, 17 ♀♀ from : Queensland ; Rossell I., ii. (Meek) ; St. Aignan, ix. (Meek) ; Milne Bay, Brit. N. Guinea, iii. (Meek) ;

Fergusson and Trobriand (Meek); Humboldt Bay, Dutch N. Guinea, ix. x. (Doherty).

This form might be confounded by a casual observer with *M. errans errans*, especially with such specimens of the latter in which the grey median interspace is reduced to two small patches in consequence of the antemedian and discal bands being merged together mesially. The first and second discal lines of *errans* are, however, straight in front, the abdomen is grey above, and shows dark basal dots also on segments 5 and 6 (the two dots of the latter segment being often merged together to a large mesial patch), the white side-tufts are larger and the palpi are longer, the triangular patch of the mesothoracic tegula is more prominent, etc.

Lucas's description of *approximans* applies to *M. corythus pylene* as regards wings, to the present species as regards abdomen; while the abdomen described under *M. lineata* is that of *pylene* and the wings, we believe, those of the subspecies we have just characterised. Neither of the two names *approximans* and *lineata* can be applied (see Introduction, "Nomenclature").

Lucas says, *l.c.*, of *lineata*: "Near M. trochilus, Hubn., M. sitieul, Boisd., M. corythus, Boisd."

593. **Macroglossum nubilum** spec. nov. (Pl. IV. f. 17, ♂).

♂ ♀. Resembling *M. prometheus inusitata*, but is deeper brown, the grey postmedian costal patch of the forewing extended beyond R^1 towards the distal margin, the distal border of the hindwing convex, twice the width of the yellow band, which widens behind a little. Head without white line above eye, brown triangular lateral area of palpus not sharply defined above: first yellow side-patch of abdomen just vestigial, second and third prominent, with deep black patches at the proximal side.

Wings, *upperside*.——Forewing: antemedian lines not conspicuous, not distinctly filled in with dark brown, more strongly curved than in *prometheus*; first discal line very indistinct, except at costal margin, strongly angulated in front like the second, which is distinct, interspace filled in with brown from costal margin to angle of lines; grey costal space following this line continued beyond R^1, reaching more distally R^2 or even R^3; subapical patches SC^4—R^1 dark russet, the second blackish distally.——Hindwing: black basal area continued along SM^2, joining the black distal border, the yellow band in consequence proximally convex; this band not reaching costal edge, at R^2 barely half the width of the distal border.

Underside: Mars-brown or mummy-brown, deeper in tint than in *M. prometheus*; the yellow abdominal area of the hindwing very sharply limited distally.

♂. Tenth tergite truncate; sternite rounded-dilated at end. Clasper *with* friction-scales; harpe short, curved upwards at end, tip acute (Pl. L. f. 46). Process of penis-sheath (Pl. LVI. f. 26) obtuse at end, its dentate base projecting also a little at the left side, the whole process boomerang-shaped; internal rods obtuse at end.

Hab. British New Guinea and neighbouring islands.

In the Tring Museum 1 ♂, 6 ♀♀ from: Milne Bay, Brit. N. Guinea, i. '99 (Meek), *type*; Holnicote Bay to Owen Stanley Mts. (Rohn); Kiriwini, Trobriand Is., iii. iv. '95 (Meek); Woodlark, iii. '97 (Meek).

594. **Macroglossum variegatum** spec. nov. (Pl. III. f. 13, ♂).

Macroglossa sitiene Walker, *List Lep. Ins. B. M.* viii. p. 92. n. 13 (1856) (partim); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 115. n. 189 (1892) (partim).

♂♀. Differs from *heliophila*, with which it agrees best, in the following points: abdomen with pairs of black dots at the bases of tergites 3, 4, and 5; underside of palpus and middle of breast clayish, very much darker than in *heliophila*, abdomen generally deeper brown, without whitish grey patches on the first sternites. Antemedian band of forewing not so prominent, much more curved, almost at right angles to costal margin; first and second discal lines also obviously more curved, S-shaped, median interspace less pale than in *heliophila*, shaped like an hour-glass, but upper part larger than lower, second discal line dilated distad behind R^1, but this projection not very conspicuous: R^1 grey; postdiscal line and its grey border distinct, continuous from costal to hinder margin; distal edge feebly scalloped in fresh specimens, with darker dots at the tips of the veins; a pale stigma with a dark spot at its proximal side in fresh individuals.

♂. Tenth tergite truncate; sternite less acuminate than in *heliophila*. Clasper without friction-scales; harpe (Pl. LI. f. 1) short, acuminate, curved upwards and then distad, underside often with teeth. Process of penis-sheath (Pl. LVI. f. 35) short, obtuse, slender, dentate at end as well as at proximal edge, the dentition of the base extending on to the sheath; internal rods rounded at end.

Hab. North India; Borneo; Sumatra. Probably more widely distributed in the Indo-Malayan Subregion.

In the Tring Museum 10 ♂♂, 8 ♀♀ from: Cherrapunji (*type*); Khasia Hills; Shillong; Sikhim; Borneo.

In many collections, mixed up with specimens of other species.

595. **Macroglossum saga.**

**Macroglossa saga* Butler, *Ent. Mo. Mag.* xiv. p. 206 (1878) (Japan;—Mus. Brit.); id., *Illustr. Typ. Specim. Lep. Het. B. M.* ii. p. 3. t. 21. f. 1 (1878); Kirby, *Cat. Lep. Het.* i. p. 632. n. 44 (1892).

Macroglossa pyrrhosticta, Leech (*non* Butler, 1875), *Proc. Zool. Soc. Lond.* p. 582. n. 7 (1888) (China, Japan).

**Macroglossa kinshiuensis* Rothschild, Nov. Zool.. i. p. 66 (1894) (Kiushiu;—Mus. Tring).; id., *l.c.* iii. t. 13. f. 2 (1896).

**Macroglossa glaucoplaga* Hampson, *Journ. Bombay N. H. Soc.* xiii. p. 40. n. 184 a. t. B. f. 13 (1900) (Sikhim, 1300 ft.;—Mus. Brit.).

♂♀. No white line above eye; palpi long, beneath white, speckled with black scales; breast greyish wood-brown; head and thorax above with darker mesial vitta, abdomen with two yellow side-patches, besides a vestige of a patch on second segment, a double series of dark dorsal spots; tail above blackish brown; side-tufts of posterior segments with dark buff tips, those of proximal segments with white tips, underside of abdomen uniform in colour.

Wings, *upperside*.——Forewing with the grey and the brownish black parts rather sharply contrasting; antemedian lines curved, filled in with brownish black, this band dilated basad at hinder margin; median interspace grey; first and second discal lines angulated at R^1, concave between R^1 and hinder margin, interspace dark except behind, first line generally not prominent behind; grey costal space extended to apex of wing, the subapical rufous patch SC^5—SC^5 being shaded over with grey, grey postdiscal line within this area conspicuous, R^1 grey between second and third

line, the area behind the grey patch blackish, the grey area limited by the apical triangular halfmoon, by the subapical patch SC^5—R^1 and the grey line R^1.——Hindwing : yellow band somewhat variable in width, at R^2 barely half the width of the black border ; fringe vinaceous cinnamon.

Underside dark russet, more or less shaded with grey on hindwing; yellow abdominal area of hindwing not very sharply defined distally.

♂. Tenth tergite somewhat prismatical, truncate at end ; sternite rounded at end. Clasper *with* friction-scales ; harpe (Pl. L. f. 44) very short, obtusely pointed, conical. Process of penis-sheath dentate only at base, this dentition variable, slightly extending on to the sheath ; internal rods obtuse at end.

Hab. Japan to North India.

In the Tring Museum 8 ♂♂, 8 ♀♀ from : Kinshiu ; Sikhim.

In coll. Charles Oberthür several specimens from Sikhim.

The yellow band of the hindwing is narrower in the type of *glaucoplaga* than in other specimens.

596. **Macroglossum godeffroyi.**

**Rhamphoschisma godeffroyi* Butler, *Ann. Mag. N. H.* (5). x. p. 157 (1882) (Duke of York ;—Mus. Brit.).

Macroglossa godeffroyi, Kirby, *Cat. Lep. Het.* i. p. 632. n. 52 (1892) ; Pagenst., in Chun, *Zoologica* x. 29. p. 19. n. 21 (1900) ("not seen").

♂. Under and internal surface of foretarsus with long scaling, especially the first segment. Mid- and hindtibia with very long hairs on underside which form a large tuft similar to the tuft of the abdominal scent-organ ; first segment of tarsi with long scales on ventral side, the tarsi not longer than the respective tibiae. Dorso-lateral black spots of abdomen very prominent. Antemedian band of forewing very broad, disco-cellular veins within this band, which touches in middle a large disco-marginal area of the same colour, thus separating the grey median space into a costal and a posterior patch ; a grey postdiscal subapical patch, extended distad to outer margin.

Tenth sternite broad, feebly sinuate. Harpe short, obtuse, compressed. Penis-sheath with long and proximally broadened process which is dentate all over ; a large patch of teeth at the left side of the sheath.

Hab. Neu Lauenburg = Duke of York Island.

One ♂ in the British Museum ; not seen in other collections.

The tufts of the mid- and hindtibia are a very peculiar character not found anywhere else among *Sphingidae*.

597. **Macroglossum fritzei** spec. nov. (Pl. III. f. 4, ♀).

♀. Head and thorax dark grey, with a brown mesial line ; a large triangular mummy-brown patch on mesothoracic tegula conspicuously edged with grey ; abdomen blackish brown, two large yellow side-patches on segments 2 and 3, and a smaller one on 4 ; underside of palpus vinaceous grey, dark triangular lateral patch not sharply marked ; breast pale vinaceous in middle, darker at sides ; abdomen bright tawny, apical margins brown, a lateral series of conspicuous buff yellow spots.

Wings, *above*.——Forewing : antemedian lines much more oblique than in other species, filled in with deep brown, the band reaching costal margin in front of apex of cell, conspicuously bordered with greyish white proximally ; first and

second discal line irregularly dentate, curved costad in front, interspace not filled in, a pale space M^1—SM^2 between second discal and postdiscal line, the latter line dentate, with a sharply marked buffish border; subapical spot SC^4—SC^5 somewhat rufous, the next spot blackish.——Hindwing: yellow band broad, black border of wing correspondingly narrow, its inner edge almost straight.

Underside peculiar.——Forewing: rufous-chestnut, blackish brown border very distinct, owing to a series of irregular buff-yellow postdiscal patches, patch R^1—R^2 vestigial; within these patches there are two thin dentate lines; extreme base yellowish.——Hindwing: reddish anteriorly, base and abdominal area yellow, this colour gradually shading off on disc, only 1 mm. short of tip of SM^2; brown border sharply marked, indications of pale yellow spots at its inner edge; discal lines reddish.

Length of forewing: ♀, 21 mm.

Hab. Loo Choo Islands and China.

In the Tring Museum 1 ♀ from Okinawa, July 1891 (Dr. A. Fritze), *type*.

Another specimen (♀) in the British Museum from Hongkong.

Differs from all other species in the very oblique antemedian band of the forewing.

598. Macroglossum glaucoptera.

**Macroglossa glaucoptera* Butler, *Proc. Zool. Soc. Lond.* p. 241. n. 7. t. 36. f. 9 (1875) (Ceylon;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 525. n. 15 (1877); Moore, *Lep. Ceylon* ii. p. 30. t. 93. f. 3, 3a (*l., p., i.*) (1882); Kirby, *Cat. Lep. Het.* i. p. 631. n. 37 (1892); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 115. n. 190 (1892) (Ceylon).

Macroglossa obscuriceps Butler, *Proc. Zool. Soc. Lond.* p. 309. n. 3. t. 22. f. 5(1876) (Ayerpanes, Malacca); id., *Trans. Zool. Soc. Lond.* ix. p. 635 (1877); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 7. n. 26 (1892) (Singapore); Kirby, *l.c.* p. 630. n. 15 (1892).

**Macroglossa lepsha* Butler, *Trans. Zool. Soc. Lond.* ix. p. 635 (1877) (Calcutta;—coll. Atkinson, now in coll. Standinger).

Macroglossa fuscata Huwe, *Berl. Ent. Zeitschr.* xl. p. 358. n. 11. t. 3. f. 5 (♂) (1895) (Java).

♂♀. Similar to small specimens of *M. corythus luteata*.

Wings, *upperside*.——Forewing deep in tint, dark brown in basal area, the two antemedian lines little darker, filled in with dark brown; median interspace greyish, wider in front than behind, discal lines not prominent, first and second very feebly curved, more or less filled in with dark brown.——Hindwing: yellow band narrow, more or less interrupted in ♂, sometimes only vestigial; distal border very broad, broader behind than in western *corythus*.——Basal areas of both wings shaded with yellow beneath, yellow abdominal area of hindwing not sharply limited distally.

♂. Tenth tergite (Pl. XLV. f. 6) truncate, slightly sinuate, the angles somewhat projecting laterad. Clasper with a few friction-scales; harpe (Pl. L f. 39) similar to that of *semifasciata*, much shorter than in *corythus*, extreme tip truncate and notched (Pl. L. f. 40). Process of penis-sheath (Pl. LVI. f. 22) very long, dentate at the proximal edge, very long teeth upon the sheath near the base of the process, besides numerous small ones; internal rods both acuminate.

Hab. Ceylon to Java.

In the Tring Museum 1 ♂, 1 ♀ from Penang and Ceylon.

There is probably an eastern Indo-Malayan and a western Indo-Ceylonese subspecies.

599. **Macroglossum vidua** spec. nov. (Pl. III. f. 15, ♀).

♀. Colour of body above not well preserved, apparently no dark middle stripe on head and thorax, mesothoracic tegula darker brown behind, without a sharply defined triangular patch; abdomen with three small yellow side-patches, second the largest, tail dark, a black mesial patch at base; underside of palpus and middle of breast dirty grey, the white scaling being much mixed with drab-brown scales, sides rather darker, abdomen also grey (much rubbed).

Wings, *upperside*.——Forewing: antemedian band filled in with black, broad, deeper black at outer edge, dilated basad behind; median interspace greyish; discal lines indistinct, situated in an ill-defined broad shadowy band; area between this and distal edge of wing faintly greyish, excepting costal part, which is brown; no distinct subapical spots, no grey postdiscal costal patch.——Hindwing: yellow band interrupted, reduced, ill-defined.

Underside of both wings dark walnut-brown, dull, somewhat olivaceous distally, without distinct brown border, bases faintly greyish, yellow abdominal area of hindwing restricted, sharply defined.

Length of forewing: ♀, 22 mm.

Hab. Waigeu I.

One ♀ in coll. Charles Oberthür, received from Messrs. Staudinger & Bang-Haas.

Resembling *glaucoptera* and small specimens of *M. corythus luteata* and *M. sylvia*; recognisable by the dirty grey colour of the palpi below, the greyish, not distinctly yellow, bases of the wings below, the broad antemedian band of the forewing, etc.

600. **Macroglossum joannisi** spec. nov. (Pl III. f. 2, ♀).

♀. Head and thorax olive-grey, the scales with pale tips; without dark mesial stripe; mesothoracic tegula somewhat deeper brown behind, like metanotum: abdomen shaded with grey mesially, four yellow side-patches, transverse diameter of second nearly as long as the diameter of the dorsal interspace; sixth tergite blackish brown at sides and base, seventh black in middle, yellowish buff at base, chestnut at sides, tail tawny at end. Underside of palpus white, middle of breast clayish grey, sides vinaceous clay-colour, abdomen cinnamon-rufous, paler in middle, tail the same colour, side-tufts yellow, that of seventh segment black at base, then yellow, and white at the tip.

Wings, *upperside*.——Forewing: subbasal and median interspaces obviously grey, disc also shaded with grey; antemedian band curved, black; discal lines very slightly curved, not distinctly angulated at R^1, interspace not quite filled in with black; postdiscal line complete, the interspace between second discal and postdiscal line grey, this colour extended distad between R^1 and SM^2, not reaching margin, no separate costal postdiscal patch; dark subapical spots SC^4—R^1 of other species here vestigial, barely deeper in tint than the brown marginal border.——Hindwing: yellow band interrupted, much suffused with black, not sharply marked, except in cell.

Underside of forewing dark walnut-brown, yellow at base; no distinct distal border.——Hindwing bright cinnamon-rufous, brighter than the abdomen, base and abdominal area yellow, the latter not sharply limited distally, extreme edge of wing and fringe deeper brown.

Length of forewing : ♀, 22 mm.

Hab. Queensland.

One ♀ in the collection of Monsieur l'Abbé de Joannis, who kindly lent it us for description and figuring.

Abundantly distinct from all other known *Macroglossum* by the four yellow abdominal side-patches and the bright underside of the hindwing, together with the pattern and colour of the upper surface of body and wings.

601. Macroglossum semifasciata.

**Macroglossa semifasciata* Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 115. n. 187 (1892) (E. Pegu ; Labuan ; — Mus. Brit.).

**Macroglossa fara*, Piepers (*non* Cramer, 1780), *Tijdschr. Ent.* xl. p. 48. n. 120. p. 101. t. 3. f. 10 (*l.*) (1897) (Java).

♂♀. Yellow side-patches of abdomen very small, vestigial, the black patches prominent, seventh segment with a black mesial patch, anal tuft dark, side-tufts white-tipped ; palpus grey, breast darker, abdomen with ill-defined buffish grey mesial patches on proximal segments, seventh sternite more or less grey in ♀.—— Forewing, above, with the interspace between the two oblique antemedian lines filled up with black in posterior half, this band narrow, curved basad behind ; first and second discal lines not very distinct, interspace not filled up with black. ——Base of hindwing more extended black than in the allied species, especially in a ♂ from Java, joined along abdominal margin to distal border. In this ♂ the yellow area of the hindwing below not reaching halfway to tip of SM^2, while it extends to the third discal line in specimens from other places.

♂ from Java. Tenth tergite truncate ; sternite rounded at end, carinate above. Clasper *with* friction-scales ; harpe (Pl. L. f. 32) slender, pointed. Process of penis-sheath (Pl. LVI. f. 47) obtuse, dentate, its base projecting, two rows of teeth at its base ; longer internal rod acuminate, but not produced into a needle-like process.

Larva (fig. by Piepers), when adult, blackish brown, dotted with grey, a pale dorso-lateral line on head and pronotum ; a dark dorsal line from head to horn ; this long. Stage before last : head and anterior segment (or segments), sometimes also the middle part of the back, green.

Hab. Burma to Borneo and Java.

In the Tring Museum 2 ♂♂ from : Borneo ; Java (Piepers).

In coll. Staudinger from S.E. Borneo (Wahnes) and Kinabalu (Waterstradt).

602. Macroglossum aquila.

**Macroglossa aquila* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 340. n. 30 (1875) (Cochinchina ; Silhet ; — coll. Charles Oberthür) ; Kirby, *Cat. Lep. Het.* i. p. 631. n. 29 (1892).

**Macroglossa interrupta* Butler, *Proc. Zool. Soc. Lond.* p. 242. n. 10. t. 37. f. 2 (1875) (Darjiling ; — Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 526. n. 21 (1877) ; Kirby, *l.c.* n. 32 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 119. n. 201 (1892) (= *aquila*) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 419. n. 201 (1898) (Sikhim, 1000 ft., ix.).

♂♀. Subapical spot SC^5—R^1 of forewing above as prominent as in *assimilis*, antemedian lines more proximal than in other species ; costal edge of hindwing dilated into a *lobe* before middle.

♂. Tenth tergite gradually narrowed, apex obtuse, slightly curved downwards ; sternite rounded at end. Clasper *with* friction-scales ; harpe short, stout (Pl. LI. f. 2), with the upperside excavated, and the edges dentate, looking like a tooth-

brush in a side-view. Process of penis-sheath (Pl. LVI. f. 34) slender, denticulate at the proximal edge, also at the rather obtuse tip, a large patch of teeth at and near its base upon the sheath.

Early stages not known.

Hab. North India to the Philippines.

In the Tring Museum 6 ♂♂, 2 ♀♀ from : Silhet ; Khasia Hills ; Cherrapunji, xi. : Padang Rengas, Malay Pen. ; Mt. Mulu, Sarawak, viii.—xii. (Hose); Manila, ii.

603. **Macroglossum sylvia.**

**Macroglossa sylvia* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 350. n. 29 (1875) (partim ; Celebes ;—coll. Charles Oberthür) ; Kirby, *Cat. Lep. Het.* i. p. 632. n. 51 (1892).

**Macroglossa obscura* Butler, *Proc. Zool. Soc. Lond.* p. 5. n. 5. t. 1. f. 2 (1875) (Java ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 528. n. 29 (1877) ; Kirby, *l.c.* p. 631. n. 39 (1892) ; Swinh., *Trans. Ent. Soc. Lond.* p. 162. n. 3 (1890) (Upp. Tenass.) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 357. n. 7 (1895) (Java).

Macroglossa proxima, Hampson (*non* Butler, 1875), in Blanf., *Fauna Brit. Ind., Moths* i. p. 114. n. 186 (1892) (partim).

♂♀. Close to *corythus luteata* in colour. Three small pale yellow side-spots on abdomen, the first reduced to a transverse line, barely vestigial in *type*, the second smaller than the dark brown patch at its basal side, the third again more or less linear. Abdomen below with the seventh segment grey, proximal segments with grey mesial patches ; side-tufts tipped with white, last two often somewhat ochraceous. Yellow area of hindwing below reduced, not extending so close to distal margin as in most specimens of *corythus*, more sharply defined distally.

♂. Harpe nearly exactly as in the otherwise widely different *M. alcedo* (Pl. L. f. 47), being very short, hooked at end, obtuse, with the apical part denticulate. Process of penis-sheath (Pl. LVI. f. 45) shorter than in *corythus*, obtuse, dentate at the proximal and distal edges : the teeth upon the sheath near the base of the process very numerous, extending far proximad, sometimes arranged into long rows ; rods within sheath both obtuse.

Hab. Celebes to Ceylon and Formosa.

In the Tring Museum 2 ♂♂, 7 ♀♀ from : Ceylon ; Khasia Hills ; Formosa ; Perak ; Java.

The yellow band of the hindwing is narrowest in Ceylon specimens and sometimes interrupted.

604. **Macroglossum eichhorni** spec. nov. (Pl. III. f. 14, ♀).

♀. Head and thorax hair-brown, with a dark mesial stripe, a large dark triangular space on mesothoracic tegula ; a white line above eye ; abdominal tergites almost black, a pair of basal black spots on fourth segment ; a small transverse side-spot on second, a large patch on third and fourth segments, orange-ochraceous, seventh tergite more tawny or the same colour, with a black mesial patch, tail entirely pale orange-ochraceous, side-tufts all pale ochraceous at end ; underside of palpus whitish grey, middle of breast buff, sides darker, abdomen tawny-ochraceous, with the sides darker.

Wings, *upperside*.——Forewing : a broad antemedian band, completely filled in, narrowing costad, dilated basad behind, outer edge scarcely curved, basal area blackish, but not so deep as the band ; median interspace greyish ; discal lines very feebly curved costad in front, first thin, vestigial, second heavy, band-like, indistinctly

dilated distad behind R^1, brownish black subapical spot SC^5—R^1 distinct, a rufous spot in front of it, grey postdiscal line as close in front to second discal as this is to first. ——Yellow band of hindwing constricted, the black border strongly convex, broad.

Underside chestnut, distal margins brown, base of forewing and basal third of hindwing yellow, abdominal area of the latter deeper yellow, sharper defined distally, about 2 mm. short of tip of SM^2.

Length of forewing: ♀, 24—25 mm.

Hab. Solomon Islands: Guadalcanar and Florida.

In the Tring Museum 3 ♀♀ from: Guadalcanar, March and May, *type*; Florida, January (Messrs. A. S. Meek & Eichhorn).

Reminding one by the yellow tail of *M. corythus fulvicaudata*, but distinguished by the tail being entirely yellow, the preceding segment being of about the same colour, with a black median patch, and by the different pattern of the forewing.

605. **Macroglossum corythus.**

**Macroglossa corythus* Walker, *List Lep. Ins. B. M.* viii. p. 92. n. 14 (1856) (partim; Ceylon, Canara;—Mus. Brit.); Pagenst., *Abh. Senk. Nat. Gesellsch.* xxiii. p. 443. n. 421 (1897) (Celebes; Batjan).

♂♀. Geographically, sexually, and individually variable in the amount of yellow on body and wings; not difficult to recognise by the pattern of the forewing. Head and thorax with a distinctly darker mesial line in fresh specimens; abdomen with three yellow side-patches, variable in size, separate from each other, the first always transverse; tail below yellow or tawny, never all black.

Wings, *upperside*.——Forewing with the antemedian lines straight, the basal area darker than the greyish median interspace, but not so dark as in *passalus*; first and second discal lines rather far apart, very slightly curved; third line vestigial, a grey submarginal space from R^1 backwards, often blue in side-light, separated from or almost joined to a small discal costal space of the same colour; *no* distinctly marked dark subapical spots.——Hindwing: median band deep chrome, base and distal margin black, inner edge of distal border covered by yellow hairs and scales, median veins more or less black, the yellow band often interrupted, especially in ♂♂.

Underside variable, abdominal area of hindwing yellow.

♂. Tenth tergite truncate or rounded at end; sternite long, sole-shaped, rounded at end, here incrassate, upperside transversely carinate, somewhat raised in mesial line. Clasper *with* friction-scales; harpe (Pl. L. f. 41) long and pointed in all forms, reaching nearly to the end of the clasper, differing obviously from that of all other *Macroglossum*. Penis-sheath with two internal rods, generally not visible without the sheath being opened, one of the rods produced into an acute point (Pl. LVI. f. 46), the other obtuse; dentate process somewhat variable in length and dentition, tip and apical part of distal edge apparently always dentate, the proximal edge dentate from base to apex, a number of teeth upon the sheath near the base of the process.

Length of forewing varying from 20 to 30 mm.

Larvae and pupae figured by Moore and Semper (see below sub *M. corythus luteata* and *corythus*).

Hab. Japan, China, N. India and Ceylon, eastwards all over the Indo-Australian Islands to New Caledonia.

The seven subspecies are not sharply defined; in a long series of specimens

intergradations turn up rather frequently. The Indo-Malayan specimens are generally dark-tailed, those from the Papuan Subregion as a rule yellow-tailed, but the subspecies from Lifu, Loyalty Islands, is again dark-tailed.

A more than usual amount of nomenclatorial muddle attaches to this species. Boisduval named in manuscript as *corythus* a small species dealt with in the present Revision as *pyrrhosticta*. Walker adopted Boisduval's name, but applied it to a motley of at least three widely different species, treating as "var. β" what Boisduval had named *corythus* in the Museum's collection. This was in 1856. Moore, in 1857, in the *Catalogue of the Lep. of the East India Company*, p. 262, applied the name of *corythus* to individuals from Java, Canara, Darjeeling, and Ladakh, probably a mixture of species, and added a manuscript name of Horsfield's, *M. arcuatum*. In 1875 Boisduval published his notes made about thirty years before at the British Museum, regardless of which species Walker had actually described, taking it for granted that Walker had in every case applied the manuscript name to that species for which it was originally intended by Boisduval. In this work *corythus* is the insect described shortly afterwards by Butler as *pyrrhostieta*, agreeing with Walker's "var. β." of *corythus*. In the Revision of the *Sphingidae* in 1877 Butler says that the labels to *gilia* and *corythus* were transposed in the cabinet; but as he gives under *gilia* only the locality Silhet (Stainsforth), which Walker mentioned under *corythus* var. β and not under *gilia*, Butler was evidently wrong in the supposition of the labels having become changed, *i.e.* the alteration of the labelling carried out by Butler was erroneous. Further, the specimens first enumerated by Walker under *corythus* were described by Butler in 1875 as *proxima*, coming from Canara and Ceylon, to which localities he added in 1877 Silhet, having, however, described in 1875 as *luteata* another Silhet individual of the same species. Thus Butler restricted *corythus* to the two Java individuals "*c. f.*" under Walker's description. In Hampson, 1892, the name of *corythus* appears as a synonym of a species totally different again from all the forms covered by Walker's name *corythus*. This is not all—the Java insect to which Butler restricted the name of *corythus* in 1875, was shortly before wrongly identified and described by Boisduval as Walker's *divergens*, and then renamed *prometheus*, Boisduval always adding his beloved manuscript names to the names already published by others.

Now to which insect must Walker's name of *corythus* be restricted? Certainly not to his "var. β," as the variety cannot be typical. Then there remain two species. The second was named *prometheus* by Boisduval, and the first *proxima* by Butler shortly after. Walker's description agrees with both species and others besides except in one point, namely in the remark that the luteous band of the hindwing is occasionally interrupted. This character only fits the species of which various subspecies have subsequently been described as *pylene*, *luteata*, *fulvicaudata*, etc., etc., and not the species called by Boisduval *prometheus* and treated by Butler as *corythus*. Besides, Ceylon and Canara are the first localities mentioned by Walker, which alone would settle the question for us in this sense that *corythus* of Walker (1856, Ceylon, Canara) and Butler's *proxima* (1875, Canara, Ceylon) are identical.

a. M. corythus platyxanthum subsp. nov. (Pl. IV. f. 1, ♂).

♂♀. Similar to *M. corythus luteata*, but the yellow band of the hindwing broader, the black border narrower at anal angle; the basal area below shaded with

yellow, less deep in tint than in *lutcata*. In one of our ♀♀ the hindwing has very little black at the base. The yellow abdominal spots vary in size.

Hab. Okinawa, Loo Choo Islands.

In the Tring Museum 9 ♂♂, 8 ♀♀, mostly collected by Dr. Fritze on Okinawa from the middle of July to the middle of August 1891.

b. M. corythus luteata.

Macroglossa corythus Walker, *l.c.* (partim).

**Macroglossa luteata* Butler, *Proc. Zool. Soc. Lond.* p. 241. n. 9. t. 37. f. 5 (1875) (Silhet;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 526. n. 18 (1877); Moore, *Proc. Zool. Soc. Lond.* p. 844 (1878) (Ahsown, Upp. Tenass.); id., *Journ. As. Soc. Bengal* liii. 2. p. 234. n. 2 (1884) (Cachar); Swinh., *Trans. Ent. Soc. Lond.* p. 162. n. 2 (1890) (Tenasserim).

Macroglossa proxima Butler, *Trans. Zool. Soc. Lond.* ix. p. 526. n. 20 (1877) (partim); id., *Proc. Zool. Soc. Lond.* p. 815. n. 42 (1877) (Formosa); Swinh., *Trans. Ent. Soc. Lond.* p. 162. n. 4 (1890) (Moulmein); Kirby, *Cat. Lep. Het.* i. p. 630. n. 17 (1892) (partim); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 114. n. 186 (1892); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 417. n. 186 (1898) (Sikhim & Bhutan, up to 2000 ft., vii.).

(?) *Macroglossa corythus*, Snellen, *Tijdschr. Ent.* xxii. p. 67. n. 19 (1879) (S. Celebes); Huwe, *Berl. Ent. Zeitschr.* xl. p. 357. n. 6 (1895) (Java).

**Macroglossa sylvia*, Semper (*non* Boisduval), *Schmett. Philipp.* ii. p. 407. n. 59. t. 3. f. 3. 4. 5 (*l., p.*) (1896) (Luzon; Camiguin de Mindanao; N. Mindanao; Palawan; vi.—x.); Pagenst., *Iris* iii. p. 2. n. 4 (1890) (Palawan).

♂♀. Anal tuft black above, or tawny only at the tip; underside of abdomen inclusive of tail dull chestnut-hazel, or deeper brown, side-tuft of third segment white.

Larva (see Semper, *l.c.*) brown or green; a dorso-lateral line, black in brown form, with white speckles, red and white in green form; no oblique side-bands.

Hab. China, Formosa, N. India, Andaman Islands, eastwards to the Philippines, Celebes, Flores, and Sumba. Apparently common everywhere.

In the Tring Museum 50-odd specimens from: Formosa; Tonkin; Khasia Hills; Cherrapunji; Andaman Is.; Penang; Perak; Borneo; Mindanao; Java; Flores; Sumba; Celebes.

c. M. corythus corythus.

**Macroglossa corythus* Walker, *l.c.* (1856) (partim; Ceylon; S. India;—Mus. Brit.); Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 262. n. 599 (1857) (partim; Canara).

**Macroglossa proxima* Butler, *Proc. Zool. Soc. Lond.* p. 4. n. 4. t. 1. f. 1 (1875) (Canara; Ceylon;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. 526. n. 20 (1877) (partim; Ceylon, Canara); Moore, *Lep. Ceylon* ii. p. 29. t. 91. f. 1. 1a. 1b (*l., p., i.*) (1882); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 114. n. 186 (1892) (partim); Kirby, *Cat. Lep. Het.* i. p. 630. n. 17 (1892).

♂♀. Abdomen paler below than in *luteata*, the anal tuft often more extended tawny, the side-tuft of the third segment buff, only with the extreme tip white.

Larva (see Moore, *l.c.*, where three forms are figured; are they one species?) clayish brown or blackish; a dorso-lateral line which is feebly marked, or absent, on the middle segments; white spots beneath stigmata; black form speckled with white; a third form with complete side-line and reddish lateral patches.

Hab. Ceylon and South India.

In the Tring Museum 3 ♂♂, 4 ♀♀ from Ceylon and South India.

d. M. corythus pylene (Pl. IV. f. 7, ♂, *type*).

**Macroglossa pylene* Felder, *Sitz. Ber. Ak. Wiss. Wien* xliii. p. 29 (1861) (Amboina;– Mus. Tring); Butl., *Trans. Zool. Soc. Lond.* ix. p. 525. n. 11 (1877); Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 109. n. 215 (1888) (Amboina); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 6. n. 21 (1892) (Ceram; Waigeu).

**Macroglossa phlegeton* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 346. n. 22 (1875) (N. Guinea ;—coll. Charles Oberthür) ; Kirby, *Cat. Lep. Het.* i. p. 631. n. 27 (1892).

**Macroglossa motacilla* Boisduval, *l.c.* p. 347. n. 25 (1875) (Dorey ;—coll. Charles Oberthür) : Kirby, *l.c.* n. 25 (1892).

**Macroglossa cyniris* Boisduval, *l.c.* p. 350. n. 30 (1875) (Halmahera ;—coll. Charles Oberthür) ; Kirby, *l.c.* n. 26 (1892).

**Macroglossa volucris*, Pagenstecher (*non* Walker, 1856), *Jahrb. Nass. Ver. Nat.* xxxvii. p. 210 (1884) (Amboina) ; id., *l.c.* xxxix. p. 112. n. 7 (1886) (Aru) ; id., *Iris* i. p. 86. n. 7 (1886) (Aru) ; id., *Jahrb. Nass. Ver. Nat.* xli. p. 109. n. 212 (1888) (Amboina).

Macroglossa approximans Lucas, *The Queenslander* xxxix. p. 834 (1891) (Mackay ; excluding abdomen).

Macroglossa lineata id., *l.c.* (1891) (Mackay ; abdomen only !).

**Macroglossa labrosa* Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 5. n. 19 (1892) (Buru ;—Mus. Oxford).

**Macroglossa moluccensis* Rothschild, Nov. Zool. i. p. 67 (1894) (partim ; N. Guinea ; Moluccas ; —Mus. Tring).

♂♀. Anal tuft with about the apical half orange-ochraceous or pale tawny ; underside of tuft as a rule as pale yellow as the mesial patches of the abdomen ; side-tufts of third to fifth segments of the same colour as underside of tail, often more yellow at the tips, not white ; middle of breast shaded with ochraceous, base of hindwing more or less yellow.

The individual variation in our long series of specimens from Little Key and Dutch New Guinea is considerable, and we have not found a character by which to separate the examples from the Moluccas from those obtained in various other places. But the specimens of one locality taken as a whole are not always identical with the set of specimens from another island. The Mefor individuals, for instance, are more yellow on the underside of the abdomen than most examples from other localities. In British New Guinea and dependent islands the yellow band of the hindwing is much reduced even in the females, while the band is more often complete than interrupted on the Southern Moluccas.

Hab. Southern and Northern Moluccas ; Key ; Aru ; all over New Guinea and the adjacent islands ; Queensland.

In the Tring Museum 60-odd specimens from : Halmahera ; Batjan ; Obi ; Buru ; Amboina ; Ceram ; Tiandoe ; Key ; Aru ; Dorey ; Mefor ; Kapaur ; Milne Bay ; Woodlark ; Queensland.

e. M. corythus xanthurus subsp. nov.

♂♀. Close to *pylene*, especially to the individuals from Mefor. Tail more extended yellow and generally paler ; breast more ochraceous in middle, and palpus also shaded with ochraceous, being much less greyish white than in the other forms.

Hab. Tenimber Islands.

In the Tring Museum 8 ♂♂, 15 ♀♀ from : Larat (Kühn, *type*) ; Seira (= Sjerra), vi. vii. (Doherty) ; Selaru, iii. iv. (Micholitz).

f. M. corythus fulvicaudata.

**Macroglossa fulvicaudata* Butler, *Ann. Mag. N. H.* (5). x. p. 155 (1882) (N. Britain ;—Mus. Brit.) ; Druce, *Proc. Zool. Soc. Lond.* p. 571. n. 1 (1888) (Aola, Guadalc.) ; Kirby, *Cat. Lep. Het.* i. p. 632. n. 46 (1892) ; Pagenst., in Chun, *Zoologica* xii. 29. p. 18. n. 18 (1900) (N. Pommern).

♂♀. Side-patches 2 and 3 of abdomen large, anal tuft as extended yellow as in *xanthurus*, breast and all the tibiae ochraceous, abdomen below more or less extended yellow ; basal area C—(SM^1) of hindwing yellow as far as first discal line, this colour sometimes reaching second line behind cell.

Hab. Bismarck Archipelago and Solomon Islands.

The most yellow form. The specimens from the Bismarck Archipelago are not quite so yellow as those from the Solomons, approaching a little the Papuan subspecies *pylene*.

In the Tring Museum 12 ♂♂, 22 ♀♀ from: Guadalcanar, iv. v. (Meek & Eichhorn); Florida, i. (iid.); Isabel, vi. vii. (iid.); N. Georgia, iii. (iid.); Shortland Is. (Ribbe): Kinignunang, N. Pommern (Ribbe); Mioko (Ribbe): St. Gabriel, Admiralty Is. (Webster).

g. M. corythus fuscicauda subsp. nov.

**Macroglossa molucensis* Rothschild, Nov. Zool. i. p. 67 (1894) (partim; Lifu).

♂♀. Anal tuft above ochraceous only at the tip or quite brownish black, more or less tawny on underside; side-tufts of segments 4 to 6 yellow; underside of abdomen nearly as dark hazel as the wings, middle of segments sometimes somewhat paler; side of breast and tibiae like abdomen, middle dirty grey; palpus greyish white. Yellow band of hindwing above broad, marginal border narrower behind than in *pylene*; underside rather less extended yellow than in *pylene* on an average.

Hab. Lifu, Loyalty Islands.

In the Tring Museum 16 ♂♂, 3 ♀♀.

606. **Macroglossum multifascia** spec. nov. (Pl. VI. f. 7, ♂).

♂♀. Dark chocolate: head and thorax with a greyish flush: abdomen with one yellow transverse spot situated on third segment, a white dorso-lateral spot on fourth segment and some white scaling on last segments, side-tufts tipped with white: tail chocolate-tawny above in ♂, paler beneath, paler in ♀ than in ♂, tip not paler than base. Palpus below dirty grey like forecoxae, being clothed with a mixture of black and white scales; abdomen ferruginous tawny beneath, middle fuscous and shaded with grey.

Wings, *above*.——Forewing: three lines in basal half, three parallel discal lines curved costad in front, a scalloped postdiscal line (♀, *type*), which is barely vestigial in ♂, interspaces more or less white, a conspicuous white submarginal line in ♂, stopping at R^1.——Yellow band of hindwing not interrupted, broader in ♀ than in ♂.

Underside ferruginous-tawny on disc, brown distal border rather prominent: hindwing shaded with yellow from base to marginal band in ♀, less extended yellow in ♀.

♂. Clasper without friction-scales; harpe small, process straight, horizontal, obtuse, finger-shaped, but more conical. Penis-sheath (not perfect, no process preserved) with internal rods rounded at end.

Hab. Sarawak, Borneo (Pryer), 1 ♀ (*type*) in British Museum: Java? (Flesch), 1 ♂ in Mus. Budapest, here figured.

The peculiar striping of the forewing distinguishes this species abundantly from any other *Macroglossum*.

607. **Macroglossum tinnunculus.**

**Macroglossa tinnunculus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 344. n. 20 (1875) (Saigon;—coll. Charles Oberthür); Kirby, *Cat. Lep. Het.* i. p. 632. n. 57 (1892).

♀. Similar to *hemichroma*, but the ordinary *Macroglossum*-lines of the forewing much more distinct; a shadowy band extending from near middle of costa^1

margin to hinder margin, which it reaches not far from angle, divides the wing as in *hemichroma*, but the line of division is less sharp and the outer half of the wing is much shaded with grey, the two halves not contrasting so sharply as in *hemichroma* ; a trapeziform subapical costal patch C –R^1 and a distal marginal band not grey.

Hab. Saigon.

One ♀ (*type*) in coll. Charles Oberthür.

608. **Macroglossum hemichroma.**

**Macroglossa hemichroma* Butler, *Proc. Zool. Soc. Lond.* p. 243. n. 14. t. 37. f. 1 (1875) (Silhet ;— Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 528. n. 33 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 632. n. 53 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 118. n. 200 (1892).

Macroglossa tinnunculus, Semper (*non* Boisduval, 1875), *Schmett. Philipp.* ii. p. 407. n. 60. t. 51. f. 7 (1896) (Cebu).

♂ ♀. Forewing sharply divided into a pale basal and a darker distal area, the line of separation running straight across the wing, beginning at costal margin just proximally of upper angle of cell and reaching hinder margin several millimetres proximally of angle ; antemedian and discal lines vestigial, the former curved, the latter almost straight, little curved costad in front. Head and thorax with a dark mesial line.

♂. Tenth tergite slightly dilated at end, truncate, angles rounded ; sternite incrassate at end, apical edge curving upwards, mesially acuminate, upperside transversely carinate, mesial line elevate. Clasper *with* friction-scales ; harpe ending in a very short triangular pointed process (Pl. L. f. 30). Process of penis-sheath long and slender (Pl. LVI. f. 50), directed proximad, lying close along the sheath, not denticulate, armed with a single long basal tooth which projects distad ; internal rods rounded at end, longer one dilated into a kind of tooth.

Hab. North India to Java and the Philippines.

In the Tring Museum 2 ♂♂ from : Borneo ; Java (Piepers).

609. **Macroglossum passalus.**

Sphinx passalus Drury, *Illustr. Ex. Ins.* ii. p. 52. t. 29. f. 2 & *Append.* (1773) (China).

♂ ♀. Drury's figure is rather misleading : it is far too large, the expanse being correctly given in the description as only 2 inches, and has three conspicuous yellow spots on the abdomen instead of two, as described. The dark basal area of the forewing and the pattern of the outer half of the same wing as indicated in the figure apply only to the present species, not to *pylene*, with which *passalus* has often been confounded.

Head and thorax mouse-grey, a dark mesial stripe and posterior half of mesothoracic tegula dark slate-colour, edge of tegula and metanotum russet, greenish in certain lights ; yellow side-spot of second abdominal segment small, of third and fourth larger, with conspicuous black spots at the proximal side, sixth tergite almost black, seventh with conspicuous black mesial patch, proximal side-tufts with white tips, those of sixth and seventh segments tipped with yellow or tawny ; abdomen below chestnut-hazel, side of breast and legs nearly the same, middle of breast and anterior tarsus clayish buff.

Wings, *above*.——Forewing : basal area up to first antemedian line rather darker than head, interspace between the slightly curved first and the straight second antemedian lines filled in with black, the two lines as such just vestigial :

median interspace more or less russet, palest at antemedian band, first discal line thin, more or less vestigial, second heavier, both curved costad in front, with the upper part of the interspace filled in with brown, often a vestige of another line between the two, second line joined behind R^1 to subapical spot SC^5—R^1 and apical halfmoon, a broadish black cloud from R^1 towards outer margin near angle.—— Yellow band of hindwing concave distally, the black border of wing almost evenly convex.

Underside of wings cinnamon-rufous, abdominal area of hindwing more or less yellow.

♂. Tenth tergite convex at end, obtuse ; sternite round at end. Clasper *with* friction-scales ; harpe (Pl. LI. f. 10) slender, gradually and slightly curving upwards, obtuse, feebly denticulate at the extremity. Process of penis-sheath relatively short, obtuse, multidentate at end, teeth at base long (Pl. LVI. f. 29).

Hab. South Japan to Ceylon ; not observed in the Malayan countries.

Two subspecies :

a. M. passalus passalus.

Sphinx passalus Drury, *l.c.*

Sphinx pandora Fabricius, *Ent. Syst.* iii. 1. p. 380. n. 6 (1793) (Ind. or. ;=*passalus*).

Macroglossa passalus, Westwood, in Drury, *l.c.* ed. ii. t. 29 (1837) ; Walk., *List Lep. Ins. B. M.* viii. p. 92. n. 12 (1856) (partim) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 349. n. 27 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 527. n. 22 (1877) (Shanghai ; Hongkong) ; Kirby, *Cat. Lep. Het.* i. p. 632. n. 49 (1892).

Macroglossa sturnus Boisduval, *l.c.* p. 349. n. 28 (1875) (Cochinchina ; type not preserved).

♂♀. The brighter coloured northern form. Median area of forewing and underside more rufous, first discal line of forewing above vestigial, base of hindwing below yellowish, yellow abdominal area extended, yellow band of upperside often as broad at R^3 as the marginal border.

Hab. Loo Choo Islands ; Formosa ; China ; Cochinchina (this form ?).

In the Tring Museum 9 ♂♂, 10 ♀♀ from : Okinawa, viii. '91 (Dr. Fritze) : Taipeh, Formosa, vi. '96.

b. M. passalus rectifascia.

**Rhamphoschisma rectifascia* Felder, *Reise Novara Lep.* t. 75. f. 7 (1874) (Ceylon ;—Mus. Tring).

Macroglossa rectifascia, Butler, *Trans. Zool. Soc. Lond.* ix. p. 528. n. 34 (1877) ; Moore, *Lep. Ceylon* ii. p. 27. t. 90. f. 2. (1882) ; Hamps., *Illustr. Typ. Specim. Lep. Het.* viii. p. 1. n. 14 (1891) (Nilgiris, 6000 ft., iv.—viii.). ; Kirby, *Cat. Lep. Het.* i. p. 632. n. 54 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 118. n. 198 (1892) ; id. *Illustr. Typ. Specim. Lep. Het. B. M.* ix. p. 4. n. 67 (1893) (Colombo, Ceylon).

♂♀. Yellow band of hindwing on the whole narrower, first discal line of forewing more distinct, median interspace and under surface less bright in tint, and yellow colour of hindwing below generally more restricted than in the preceding subspecies.

Hab. Ceylon and South India.

Will doubtless be discovered in N. India.

In the Tring Museum 7 ♂♂, 1 ♀ from : Ceylon ; South India.

610. **Macroglossum faro** (Pl. IV. f. 14, ♂).

Sphinx faro Cramer, *Pap. Exot.* iii. p. 165. t. 285 f. c (1780) (Coromandel).

Macroglossa passalus?, Walker, *List Lep. Ins. B. M.* viii. p. 92. n. 12 (1856) (partim).

Macroglossa faro, Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 263 n. 606 (1857)

(Java) ; Walk., *l.c.* xxxi. p. 27 (1864) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 348. n. 26 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 528. n. 32 (1877) : Kirby, *Cat. Lep. Het.* i. p. 632. n. 59 (1892) ; Huwe, *Berl. Ent. Zeitschr.* xl. p. 357. n. 8 (1895) (Java).

Cramer's figure agrees best with the insect characterised below ; the thorax of the specimen from which the figure was taken was discoloured, the yellow abdominal spots are too large, the sinus before the abdominal angle of the hindwing is too deep, and there is only one discal line present in the figure instead of two, the outer half of the forewing being altogether too roughly drawn, though the curved black submarginal band of the insect is rather well represented in the figure. The peculiar curve of the costal margin of the forewing is well indicated in the figure. So far no specimen from South India has come to our notice, but that does not prove the locality "Coromandel" given by Cramer to be erroneous.

♂ ♀. The largest *Macroglossum* known. Resembling *passalus* in the dark base of the forewing, the prominent straight antemedian band, the vinaceous grey median area, the feeble first discal line, the dark band-like shade extending from apex of forewing to R^2 and then curving distad, ending at distal margin before angle, etc. It differs in the yellow abdominal side-patches being comparatively smaller, in the abdominal sternite bearing large pale mesial patches, at least the proximal ones, in the antemedian lines of the forewing being more distinctly separate from one another, the second discal line being much thinner, the interspace between the first and second discal lines not being filled in with black anteriorly, and the black curved submarginal shade being more distinctly band-like. Besides, the underside is deeper brown and the base of the hindwing obviously shaded with yellow, and the upperside of the thorax (sometimes also the first abdominal tergites) is green without a darker sharply defined area on the mesothoracic tegula.

♂. Genital armature similar to that of *passalus*, but the harpe (Pl. L. f. 42) longer, with the tip more strongly recurved and more obviously denticulated : the process of the penis-sheath (Pl. LVI. f. 30) longer, more acute, with the patch of teeth at and near its base as in *passalus*, but the teeth smaller, and the underside of the process densely denticulated.

Hab. South India (Cramer) to Java, Borneo, and the Loo Choo Islands.

In the Tring Museum 5 ♂♂, 8 ♀♀ from : Okinawa, viii. '91 (Dr. Fritze) : Penang and Perak (Curtis) ; W. Java.

The Loo Choo specimens are smaller and have the costal edge of the forewing a little less curved.

A ♂ from Borneo in coll. Pagenstecher.

611. **Macroglossum meeki** spec. nov. (Pl. IV. f. 2, ♂).

♂. Similar to *passalus* and *faro*. Head slate-colour, with darker middle line : thorax above olivaceous green, mesothoracic tegula unicolorous as in *faro*, without the oblique line of *passalus* bordering a darker area ; abdominal tergites without dark dorsal basal dots, third with two white spots, three yellow side-patches on segments 2 to 4, separated from one another, side-tufts all tipped with yellow, not white, anal tuft also with yellow tip ; palpus below slaty grey, speckled with white, breast and legs clayish ochraceous, femora and sides of breast brownish ; three basal abdominal sternites yellow, with side-patches of burnt umber colour, the following segments burnt-umber.

Wings, *upperside*.——Forewing : second antemedian line quite straight, forming a band with the first line, this barely traceable on account of the basal area

being nearly as dark as the band, median area vinaceous grey, gradually shading off distally, first discal line scarcely visible, second a little more prominent, evenly curved in front, followed by a broad black band which extends from costal margin near tip to hinder margin at anal angle, distal edge of the band well defined, concave, marginal area drab.——Hindwing : yellow band interrupted, not reaching costal edge, not produced to near apex of wing (see figure), brown border broad, convex in middle.

Underside walnut-brown, distal borders mummy-brown, extreme base of forewing, base and abdominal area of hindwing, yellow, disc of hindwing also shaded with yellow posteriorly.

♂. Genital armature as in *faro*, but tip of harpe not denticulate.

Length of forewing : ♂, 27 mm.

Hab. Milne Bay, British N. Guinea, February 1899 (A. S. Meek).

1 ♂ in the Tring Museum.

Distinguished from *passalus* and *faro* by the broad black postdiscal band of the forewing extending from costal to internal margin, by the interrupted yellow band of the hindwing, by the antemedian band of the forewing being more distal behind, the white spots on the second abdominal segment, etc.

612. Macroglossum mitchelli.

**Macroglossa mitchelli* Ménétriés, *Enum. Corp. Anim. Petr., Lep.* p. 95. n. 1580 (1857) (Java ; *nom. indescr.*) : Boisduval, *Spec. Gén. Lép. Hét.* i. p. 351. n. 31. t. 8. f. 5 (1875) (Java ;—coll. Charles Oberthür).

♂ ♀. This conspicuous insect is easily recognised by the head and thorax being marked with a very dark broad median stripe which divides the pinkish grey surface into two stripes. The black discal band of the forewing is triangularly dilated behind R^1, joining the subapical and apical black spots.

♂. Tenth tergite truncate-sinuate, angle rounded ; sternite incrassate at the rounded apex. Clasper *with* friction-scales ; harpe (Pl. LI. f. 9) similar to that of *heliophila*, obtuse, somewhat curved upwards at end, not dentate. Process of penis-sheath nearly as in *heliophila*, more curved proximad, thin apical part not quite so long (Pl. LVI. f. 28).

Hab. Indo-Malayan Subregion.

Two subspecies :

a. M. mitchelli mitchelli.

**Macroglossa mitchelli* Boisduval, *l.c.* ; Kirby, *Cat. Lep. Het.* i. p. 632. n. 56 (1892).

♀. Median band of hindwing very pale yellow, narrow, slightly shaded with black in middle, at R^3 barely half the width of the black marginal border.

Hab. Java.

One ♀ in coll. Charles Oberthür (*type*).

b. M. mitchelli imperator.

**Macroglossa imperator* Butler, *Proc. Zool. Soc. Lond.* p. 243. n. 15. t. 37. f. 4 (1875) (Ceylon ; Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 529. n. 36. (1877) ; Moore, *Lep. Ceylon* ii. p. 632. n. 55. t. 90. f. 1 (1882) ; Hamps., *Illustr. Typ. Specim. Lep. Het. B. M.* viii. p. 1. n. 13 (1891) (Nilgiris, 6000 ft.) ; Kirby, *l.c.* n. 55 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 118. n. 197 (1892) (Sikhim ; Nilgiris ; Ceylon) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* ix. p. 4. n. 66 (1893) (Kandapolla, Ceylon) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 418. n. 197 (1898) (Sikhim, 5000 ft.).

♂♀. Median band of hindwing deeper yellow, much broader, at R^3 about as wide as the marginal border.

Hab. Ceylon ; S. and N. India.

In the Tring Museum 6 ♂♂ from : Cherrapunji ; Khasia and Jaintia Hills.

613. **Macroglossum phocinum** spec. nov. (Pl. III. f. 1, ♀).

♀. Head and thorax deep olive, with a dark mesial stripe ; abdomen blackish olive, a pair of black basal spots on third segment; large black side-patches, enlarged on fourth and fifth segments, no yellow patches ; underside of palpus and middle of breast and of basal sternite of abdomen dirty grey, sides of breast and legs broccoli-brown, abdomen blackish brown, side-tufts tipped with buffish white, except last.

Wings, *above*.—Forewing deep olive, lines not very distinct, the two antemedian ones more or less filled in with dark scaling, curved, the band dilated basad behind, its outer edge at lower angle of cell more distal than usually; first discal line vestigial, fused with second antemedian, except in front, second discal broad, angled and dilated distad behind R^1; costal postmedian grey patch distinct, longer than broad, R^1 grey ; postdiscal line and its grey border distinct, dentate, two blackish brown subapical patches SC^1—R^1.——Hindwing dark seal-brown, without yellow band, shaded with burnt-umber colour at and before abdominal margin.

Underside Pront's brown, base of hindwing shaded with cinnamon and grey, abdominal area dark burnt-umber, not yellow.

Length of forewing : ♀, 25 mm.

Hab. Guadalcanar, Solomon Islands, March and April 1901 (A. S. Meek & Eichhorn).

2 ♀♀ in the Tring Museum.

There is nothing known with which this species could possibly be confounded. It comes nearest to *prometheus* in the pattern of the forewing.

614. **Macroglossum buruensis** (Pl. IV. f. 4, ♀, *type*).

**Macroglossum buruensis* Holland, Nov. Zool. vii. p. 556. n. 159 (1900) (Buru ;—coll. Holland).

♀. A very peculiar species. Abdomen black ; no side-patches (the tawny spots in figure being due to the scales being rubbed off); third tergite with a buffish dorso-lateral apical transverse spot as in *meeki*; last white side-tuft large; underside contrasting sharply with the chalky white breast, this white colour extending triangularly to the base of the third segment (second sternite), a minute mesial dot on sternite of seventh segment. Fore- and midlegs and hindfemur like breast, hindtibia and -tarsus like abdomen.——Forewing *above* with the bands not prominent but distinct (see figure); hindwing unicolorous; base of both wings below white, this colour restricted, reaching on hindwing about halfway to end of SM^2.

Hab. Buru.

Only one ♀ known, in coll. Dr. Holland.

615. **Macroglossum micacea.**

**Macroglossa micacea* Walker, *List Lep. Ins. B. M.* viii. p. 96. n. 21 (1856) (partim ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 356. n. 39 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 529. n. 39 (1877) (Moreton Bay) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 7. n. 6 (1891) (Brisbane;

Rockhampton ; = *nox*) ; Kirby, *Cat. Lep. Het.* i. p. 632. n. 61 (1892) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 7. n. 28 (1892) (Moreton Bay).

**Macroglossa nox* Newman, *Trans. Ent. Soc. Lond.* (2). iv. p. 54 (1857) (Queensland ;—Mus. Brit.).

Macroglossa ethus Boisduval, *l.c.* (= *micacea*).

♂♀. Without the blue gloss of *splendens*. Abdominal tergites 3 and 4 with a transverse apical side-patch which is buffish white; a trace of a similar patch also on the second segment ; the three basal sternites have a white or buffish white mesial patch ; the prevaginal sternite is more or less white or grey. Underside of palpus and breast purer white than in *splendens*. Patch and streak before anal angle of hindwing above buff colour, not white; white basal area of the same wing below sharply limited distally in abdominal region and here shaded with buff at the edge. Fan-tail unicolorous, often fading into clayish tawny beneath and at the tip ; the ends of the scales never white.

♂. Clasper *with* friction-scales; harpe (Pl. L. f. 29) elongate, curved upwards, obtuse at end, denticulated. Penis-sheath (Pl. LVI. f. 40) with a long horizontal process, which is dentate at and near the end; two rows of teeth near its base, nearly as in *assimilis*; inner rods flattened, rounded at end, the broader one denticulate at one edge.

Hab. Queensland and Louisiade Archipelago.

In the Tring Museum 11 ♂♂, 18 ♀♀ from : Queensland; Sudest, iv. (Meek).

616. **Macroglossum splendens.**

Macroglossa micacea Walker, *List Lep. Ins. B. M.* viii. p. 96. n. 21 (1856) (partim) : Pagenst., in Chun, *Zoologica* xii. p. 19. n. 20 (1900) (Mioko ; Kinigunang).

**Macroglossa nox* Butler (*nec* Newman, 1857), *Proc. Zool. Soc. Lond.* p. 5. 7. t. 1. f. 6 (1875) (Rockingham B. ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 529. n. 40 (1877) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 7. n. 7 (1891) (Mackay ; Cardwell).

Macroglossa splendens Butler, *Entom.* xxv. p. 20 (1892) (= *nox* Butl. *nec* Newm.); Kirby, *Cat. Lep. Het.* i. p. 633. n. 62 (1892).

♂♀. Upperside of head and thorax green when fresh; abdominal tergites without white side-patches, glossy bluish grey in side-light, some black patches excepted; tips of lateral tufts white. Hindwing above bluish white before anal angle ; a bluish white streak before SM^2; pale costal area also bluish white behind, and centre of wing with a blue gloss in side-light. Basal areas of both wings below bluish white. The scales of the anal brush tipped with buffish white as a rule, sometimes all black with the tips faintly tawny, seldom quite black in Queensland individuals, nearly always so in the specimens from the Solomon Islands; our only specimen from Buru has also no white tips to the fan; the underside of the abdomen of these dark-tailed individuals has scarcely any white. End-segment of antenna very long, equalling in length (apical bristle excepted) the eight preceding segments.

♂. Harpe (Pl. L. f. 28) elongate, acute, without teeth. Penis-sheath with a long horizontal process curving round the mouth of the sheath, dentate at the lower edge, two dentate ridges upon the sheath at the base of the process (Pl. LVI. f. 53); an acutely pointed process within the sheath. No friction-scales on clasper.

Cremaster of pupa broad, triangular, bifid (Pl. LXIV. f. 22).

Hab. Papuan Subregion.

In the Tring Museum 1 pupa, 20 ♂♂, 20 ♀♀ from : Mt. Mada, Buru, ix. '98 (Dumas); Ilo, Ceram ; Queensland ; Milne Bay, Brit. N. Guinea (Meek); Kiriwini, Trobriand Is., iv. v. (Meek); Kinigunang, N. Pommern (Ribbe); Mioko (Ribbe); Isabel, vi. vii. (Meek & Eichhorn) ; Guadalcanar, v. (iid.).

CLI. RHOPALOPSYCHE.—Typus: *nycteris*.

Macroglossa, Kollar (*non* Ochsenheimer, 1816), in Hügel, *Kaschmir* iv. 2. p. 458 (1844).
Rhopalopsyche Butler, *Proc. Zool. Soc. Lond.* p. 239 (1875) (type: *nycteris*).

♂ ♀. Antenna very thin at base, strongly clubbed, proximal segments scaled also ventrally, no prolonged ciliae in either sex, the antenna of ♂ being like those of ♀, only longer and rather more strongly clubbed.

Hab. India and China.

Closely allied to *Macroglossum*.

Two species.

617. Rhopalopsyche nycteris.

Macroglossa nycteris Kollar, in Hügel, *Kaschmir* iv. 2. p. 458. t. 19. f. 5 (1844); Boisd., *Spec. Gén. Lép. Hét.* i. p. 342. n. 16 (1875) (Silhet; Darjiling; Kashmir; = *volucris*).

**Macroglossa volucris* Walker, *List Lep. Ins. B. M.* viii. p. 94. n. 16 (1856) (Silhet; N. India;—Mus. Brit.).

Rhopalopsyche nycteris, Butler, *Trans. Zool. Soc. Lond.* ix. p. 523. n. 2 (1877) (Silhet; N. India; Barrackpore); id., *Proc. Zool. Soc. Lond.* p. 378. n. 92 (1886) (Murree; viii. ix., common; Campbellpore, xi.); Cot. & Swinh., *Cat. Moths Ind.* i. p. 2. n. 8 (1887) (Sikhim; Khasia Hills; Shillong; Kulu; etc.); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 2. n. 8 (1892) (Silhet); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 111. n. 177. fig. 66 (♂) (1892) (Himalayas; Khasis; Burma); Kirby, *Cat. Lep. Het.* i. p. 634. n. 2 (1892) (N. India); Leech, *Trans. Ent. Soc. Lond.* p. 291. n. 75 (1898) (W. China, July); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 417. n. 177 (1898) (Sikhim; Bhutan, 5000—10,000 ft., v. vii.).

♂ ♀. Abdominal side-patches and band of hindwing maize-yellow.

♂. Tenth abdominal tergite slender, pointed, of the same general form as in *Macroglossum*; sternite rounded at end. Clasper without friction-scales; harpe slender, pointed, somewhat grooved longitudinally on the upperside. Penis-sheath with a very long pointed process, curving at least half round the sheath; base of process projecting, with few teeth, proximal and distal edges of process denticulate; internal rods obtuse at end, the longer one clubbed, denticulate at one edge.

Hab. N.W. and N. India; Burma; China.

In the Tring Museum 17 ♂♂, 17 ♀♀ from: Kulu; Sabathu; Allahabad; Sikhim; Khasia Hills; Buxa, Bhutan; Ta-tsien-lu, China; Loo Choo Is.

618. Rhopalopsyche bifasciata.

**Rhopalopsyche bifasciata* Butler, *Proc. Zool. Soc. Lond.* p. 239. n. 3. t. 36. f. 4 (1875) (S. India;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 523. n. 1 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 2. n. 7 (1887) (S. India); Hamps., *Illustr. Typ. Specim. Lep. Het. B. M.* viii. p. 1 (1891) (Nilgiris, 6000–7000 ft., i. ii. vi.); id., in Blanf., *Fauna Brit. Ind., Moths* i. p. 112. n. 178 (1892) (Nilgiris); Kirby, *Cat. Lep. Het.* i. p. 634. n. 1 (1892) (S. India).

♂ ♀. Abdominal side-patches and band of hindwing deep chrome; underside of wings ferruginous tawny.

Hab. Ceylon and South India.

In the Tring Museum 8 ♂♂, 1 ♀ from Ceylon and South India.

Perhaps not specifically distinct from *nycteris*.

CLII. LEUCOSTROPHUS gen. nov.—Typus : *commasiae*.

Macroglossa, Walker (*non* Ochsenheimer, 1816), *List Lep. Ins. B. M.* viii. p. 90 (1856).
Aellopus, Butler (*non* Hübner, 1822), *Trans. Zool. Soc. Lond.* ix. p. 530 (1877).

♂♀. Differs from *Macroglossum* in the end-segment of the antenna being short, in R^2 of the hindwing arising from below centre of cell, and in R^3 and M^1 being stalked together.

Early stages not known.

Hab. Africa.

Two species.

Erroneously associated by Butler and others with the American *Sesia tantalus* on account of the white abdominal belt. The two insects are true *Macroglossum* except in the points mentioned above. The white belt is an exaggerated development of the grey side-spots found in *Macroglossum stellatarum*, which species comes also in the shortness of the last antennal segment nearest to *Leucostrophus*. The pattern of the forewing, above, is as in *Macroglossum*. The hindwing is shorter than in *Macroglossum*, with the costal vein distinctly curved in front of the end of the cell, following the curve of the subcostal. The tarsi and the small (external) spurs are also rather shorter.

Key to the species :

White abdominal belt on tergites 3 and 4 . .	619. *L. commasiae*.
White abdominal belt on tergites 4 and 5 . .	620. *L. hirundo*.

619. Leucostrophus commasiae.

**Macroglossa commasiae* Walker, *List Lep. Ins. B. M.* viii. p. 90. n. 9 (1856) (W. Africa ; S. Leone ; "S. Africa" alia spec. ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 357. n. 41 (1875) (S. Leone) ; Möschl., *Abh. Senk. Nat. Ges.* xv. p. 67. n. 148 (1890) (Aburi).
Aellopus commasiae, Butler, *Trans. Zool. Soc. Lond.* ix. p. 530. n. 5 (1877) (S. Leone) ; Holl., *Trans. Amer. Ent. Soc.* xvi. p. 56. n. 4. Pl. II. f. 1 (1889) (Kangwé) ; Kirby, *Cat. Lep. Het.* i. p. 635. n. 5 (1892) (Africa).
Aellopus hirundo, Druce, in Moloney, *W. Afr. Forestry* p. 492. n. 2 (1887) (Gambia).

♂♀. The belt is bluish white and mesially excised in front. The bluish white area of the fourth tergite does not quite reach the apical margin ; it is of even width, narrowing, however, a little laterally. There is a medio-basal and apici-lateral bluish spot on the fifth tergite.

♂. Tenth tergite sinuate at end as in *hirundo* (Pl. XLV. f. 5), long, slender with long hairs; sternite also long, simple. Clasper without friction-scales ; harpe small, curving upwards at end, dilated, edge of dilated part slightly denticulated, surface with setiferous warts (Pl. L. f. 22). Penis-sheath as in *hirundo*, rather more strongly dentate.

Hab. West Africa : Gambia to the Congo basin.

In the Tring Museum 9 ♂♂, 1 ♀ from : Sierra Leone ; Ogrugu, Niger ; Gaboon ; Kuilu, French Congo ; Kasai country.

620. Leucostrophus hirundo.

Macroglossa commasiae Walker, *l.c.* (1856) (partim ; S. Africa).
**Macroglossa hirundo* Gerstaecker, in Wiegm., *Arch. Naturg.* xxxvii. p. 360 (1871) ; id., in Decken's *Reisen* iii. 2. p. 375. n. 30. t. 15. f. 7 (1873) (Mombasa, ix. ;—Mus. Berlin) ; Westw., in Oates, *Matabeleland* p. 355 (1881) (Zambesi).
Aellopus hirundo, Butler, *Trans. Zool. Soc. Lond.* ix. p. 531. n. 6 (1877) ; Kirby, *Cat. Lep. Het.* i. p. 635. n. 7 (1892) ; Butl., *Proc. Zool. Soc. Lond.* p. 674. n. 156 (1893) (Zomba, xii.).

♂ ♀. The belt is situated upon tergites 4 and 5 and is excised mesially in front as well as behind; it is chalky white, assuming a bluish tint only where some of the upper white scales are rubbed away. The underside of the abdomen is also remarkably different from that of *commasiae*, the white colour gradually fading away and the posterior half being more or less clayish, not black. The wings are paler slate-colour than in *commasiae*.

♂. Sexual armature as in *commasiae*, but the harpe longer, more hook-shaped, with the edge densely dentate (Pl. L. f. 23). End of tenth tergite sinuate (Pl. XLV. f. 5). Penis-sheath see Pl. LVI. f. 43.

Hab. East Africa: Natal to British East Africa.

In the Tring Museum 40-odd specimens from: Natal; Nyassaland; German and British East Africa.

Subfamily **Choerocampinae**.—Typus: *Pergesa elpenor*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim).
Sphingides Leech, in Brewst., *Edinb. Encycl.* ix. p. 130 (1815) (partim).
Sphingidae Samouelle, *Ent. Compend.* p. 243 (1819) (partim).
Eumorphae Hübner, *Verz. bek. Schm.* p. 133 (1822) (partim).
Deilephilae id., *l.c.* p. 136 (1822) (partim).
Chaerocampini Grote & Robinson, *Proc. Ent. Soc. Philad.* v. p. 153 (1865) (partim; *nom. nud.*).
"Déilephilides" Boisduval, *Spec. Gén. Lép. Hét.* i. p. 158 (1875) (partim).
Chaerocampinae Butler, *Trans. Zool. Soc. Lond.* ix. p. 516, 544 (1877) (partim: type: *elpenor*).
Deilephilidae Burmeister, *Descr. Rép. Argent.* v. p. 336 (1878) (partim).
Philampelidae id., *l.c.* p. 345 (1878) (partim).

♂ ♀. Pilifer consisting of an apical part bearing short (or vestigial) bristles and a proximal part bearing long ones (Pl. LXII. f. 2). Genal process short, not much projecting. Inner surface of second segment of palpus more or less naked (Pl. LIX. f. 14—27). End-segment of antenna elongate, but not filiform, with six or more very long bristles (Pl. LX. f. 12).

Larvae cylindrical, tapering in front, or third and fourth segments enlarged; a dorso-lateral and an infrastigmatical stripe, the upper often replaced by a series of ocelli; the number of ocelli variable, often only one present (on fourth segment); horn not always present in adult stage.

Pupa with compressed or carinate tongue-case, which is mostly large, in one instance (*Rhyncholaba*) projecting free and resting with end against breast.

Hab. Cosmopolitan.

This is a very sharply circumscribed group of genera. It is a development from a *Pholus*-like ancestral form, deviating from all other *Sphingidae* in the peculiar structure of the pilifer and palpus. The pilifer does not vary much within the subfamily, while the palpus exhibits various modifications in structure which are of generic value. We have here in respect to the palpus an instance of progressive specialisation; the modified palpus in which the branch now represented by a group of genera originally differed from the allied forms became farther specialised in several directions and to a various degree.

The antennae are more or less clubbed, especially in the ♀ ♀, with an abrupt hook, or setiform with a slender gradual hook; the end-segment, though somewhat varying in length, is never very short, remaining always elongate-conical or cylindrical; it is shortest in *Celerio*. Its long bristles are either all terminal and subterminal (Pl. LX. f. 12), or there are some additional ones more proximally on the ventral side; the segment has no or few scales dorsally. The antennae are

[*To face p.* 672.

CENTROCTENA.
midtibial spur with comb.
s 2 of palpi contiguous.

PHANOXYLA.
Like *Xylophanes*.
Second segment of palp
apical tuft on inne

RHYNCHOLABA.
Pupa with free tongue-case, resting with end against breast.
Segments 2 of palpi contiguous; segment 1 triangular in side-view.

XYLOPHANES.
Antenna not distinctly incrass
Eye-lashes vestigial or distinc
Palpus: first segment, on inn
irregular scaling, secon
apical tuft.
Abdominal spines uni- or mul
Larva cylindrical, tapering in
Tongue-case of pupa compres

THERETRA.
cond segment of palpus with
innerside; first always with
avity externally.

BASIOTHIA.
First segment of palpus strongly convex externally at apex; no tuft on second.

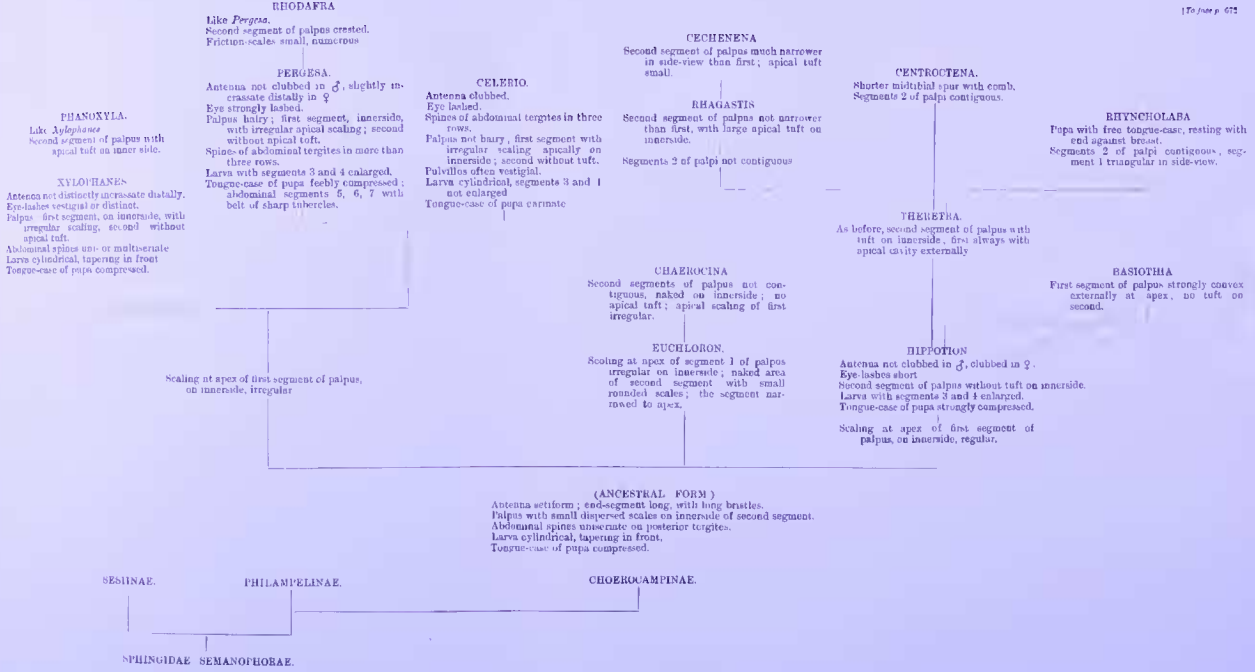
HIPPOTION.
t clubbed in ♂, clubbed in ♀.
short.
ment of palpus without tuft on innerside.
segments 3 and 4 enlarged.
e of pupa strongly compressed.

apex of first segment of
on innerside, regular.

SESII

SI

[To face p. 672


RHODAFRA
Like Pergesa.
Second segment of palpus crested.
Friction-scales small, numerous
PERGESA.
Antenna not clubbed in ♂, slightly incrassate distally in ♀
Eye strongly lashed.
Palpus hairy; first segment, innerside, with irregular apical scaling; second without apical tuft.
Spines of abdominal tergites in more than three rows.
Larva with segments 3 and 4 enlarged.
Tongue-case of pupa feebly compressed; abdominal segments 5, 6, 7 with belt of sharp tubercles.
PHANOXYLA.
Like Xylophanes
Second segment of palpus with apical tuft on inner side.
XYLOPHANES.
Antenna not distinctly incrassate distally.
Eye-lashes vestigial or distinct.
Palpus first segment, on innerside, with irregular scaling, second without apical tuft.
Abdominal spines uni- or multi-serrate
Larva cylindrical, tapering in front
Tongue-case of pupa compressed.
CELERIO.
Antenna clubbed.
Eye lashed.
Spines of abdominal tergites in three rows.
Palpus not hairy, first segment with irregular scaling apically on innerside; second without tuft.
Pulvilli often vestigial.
Larva cylindrical, segments 3 and 4 not enlarged
Tongue-case of pupa carinate
CECHENENA
Second segment of palpus much narrower in side-view than first; apical tuft small.
RHAGASTIS
Second segment of palpus not narrower than first, with large apical tuft on innerside.
Segments 2 of palpi not contiguous
CENTROCTENA.
Shorter midtibial spur with comb.
Segments 2 of palpi contiguous.
RHYNCHOLABA
Pupa with free tongue-case, resting with end against breast.
Segments 2 of palpi contiguous, segment 1 triangular in side-view.
THERETRA.
As before, second segment of palpus with tuft on innerside, first always with apical cavity externally
BASIOTHIA
First segment of palpus strongly convex externally at apex, no tuft on second.
CHAEROCINA
Second segments of palpus not contiguous, naked on innerside; no apical tuft; apical scaling of first irregular.
EUCHLORON.
Scaling at apex of segment 1 of palpus irregular on innerside; naked area of second segment with small rounded scales; the segment narrowed to apex.
HIPPOTION
Antenna not clubbed in ♂, clubbed in ♀.
Eye-lashes short
Second segment of palpus without tuft on innerside.
Larva with segments 3 and 4 enlarged.
Tongue-case of pupa strongly compressed.
Scaling at apex of first segment of palpus, on innerside, regular.
Scaling at apex of first segment of palpus, on innerside, irregular
(ANCESTRAL FORM)
Antenna setiform; end-segment long, with long bristles.
Palpus with small dispersed scales on innerside of second segment.
Abdominal spines unisecrate on posterior tergites.
Larva cylindrical, tapering in front,
Tongue-case of pupa compressed.
SESIINAE.
PHILAMPELINAE.
CHOEROCAMPINAE.
SPHINGIDAE SEMANOPHORAE.

always different in the sexes; they are never dentate or pectinate, but the segments of the hook are as a rule conically produced ventrad. The eye is lashed or not. The first segment of the palpus has often a more or less regular apical cavity in the scaling of the outer surface exposing the joint; the apical scaling of the innerside of the first segment is irregular or regular; the naked surface of the second segment, which is sometimes covered with small dispersed scales (*Euchloron*), varies in size; the upper apical angle of this segment, on the innerside, bears often a tuft of long scales directed proximad and ventrad. The length and width of the second segment is variable in the subfamily; in several instances the segment is narrowed and short-scaled, the base of the tongue being exposed (Pl. LIX. f. 10. 11). The transverse crest in *Basiothia* at the apex of the first segment, on the outerside, reminds one of a similar crest of *Sphingonaepiopsis* (*Nephelicae*). The tongue is always functional, never much reduced, often twice the length of the body.

The abdomen is conical in all forms, generally rather long and ending in a simple pointed tuft, bearing besides the apical tuft a rudimentary tuft at each side (♂); the spines are multiseriate, seldom uniseriate on the last tergites (*Xylophanes chiron, crotonis*, etc.), resembling in the latter case the spines of *Pholus*; the basal sternites bear occasionally weak spines (*Celerio lineata*); the seventh sternite is always without spines, obtusely triangular, membranaceous at end. The sexual armature is always rather simple; the friction-scales, which are never absent, are generally enlarged, mostly few in number, seldom only one present; in *Rhodafra* they are numerous and small (reduced). The scent-organ of the forecoxae is more or less distinct. The merum of the midcoxa is not angulate. The tibiae are never spinose. The midtibial spurs are normally unequal in length, the outer one being the shorter; in *Xylophanes* and *Cechenena* we find species in which the spurs are equal and also species in which the inner one is the shorter. The hindtibia has always two pairs of spurs. The external spines of the first protarsal segment are sometimes enlarged. The midtibial comb is not very prominent. The paronychium has always two pairs of lobes, but the pulvillus loses the pad in some species (*Celerio euphorbiae*, etc.).

There are 144 species known, which we bring into 14 genera. One genus is Cosmopolitan (*Celerio*); two are American (*Xylophanes* and *Phanoxyla*); five are African (*Rhodafra, Basiothia, Centroctena, Chaerocina, Euchloron*); three are Oriental (*Rhagastis, Cechenena, Rhyncholaba*); one is Palearctic, extending to North India (*Pergesa*); while two are Oriental and African (*Hippotion, Theretra*). The species are distributed as follows: Neotropical and Nearctic (including 2 from the Sandwich Is.), 56; Holarctic, 1; Palaearctic (two extending into North India), 9; Oriental, 48; Aethiopian, 28; Oriental and Aethiopian, 1; Cosmopolitan, 1. North America is very poor in species of this subfamily, possessing in the temperate zone only one cosmopolitan species (*lineata*), one Holarctic species (*gallii*), and one American species (*tersa*), which latter occurs also all over South America, besides some Neotropical stragglers in the Southern States.

The American genus *Xylophanes* is the most generalised of the Choerocampine genera in the structure of the palpus and antenna. It is worthy of note that in this genus we find in many species an abdominal spination resembling that of the ancestral form, which had, like the American *Pholus*, slender antenna and uniseriate abdominal spines. The genus which comes next as to the degree of specialisation is Cosmopolitan, while all the other, more specialised, genera are confined to the Old World, with the exception of the American *Phanoxyla*, which is a derivation from

Xylophanes. This genus *Phanoxyla* is of special interest inasmuch as it differs from *Xylophanes* in a specialisation of the palpus which recurs in several Old World genera.

Key to the genera :

a. Shorter midtibial spur with comb of prominent spines . . . . . CLXIV. *Centroctena*.
Shorter midtibial spur without such a comb . . . *b*.

b. Base of tongue exposed, second segments of palpi not contiguous . . . . . *c*.
Base of tongue not exposed, second segments of palpi contiguous . . . . . *f*.

c. Second segment of palpus obviously narrower in side-view than the first, more or less narrowing apically . . . . . *d*.
Second segment of palpus not narrower than the first . . . . . *e*.

d. Inner surface of second segment of palpus naked CLXVI. *Cechenena*.
Inner surface of second segment of palpus covered with dispersed small scales ; forewing and body above bright green, hindwing yellow and black . . . . . CLIX. *Euchloron*.

e. Second segment of palpus narrowing towards end ; Africa . . . . . CLVIII. *Chaerocina*.
Second segment of palpus not narrowing towards end ; India . . . . . CLXV. *Rhagastis*.

f. Scaling at apex of first segment of palpus, on innerside, dense and regular . . . . *g*.
Scaling at apex of first segment of palpus, on innerside, not dense, irregular . . . . *j*.

g. Second segment of palpus, on innerside, with apical tuft of scales directed proximad and ventrad . . . . . *h*.
No such tuft . . . . . *i*.

h. Scaling of first segment of palpus, on onterside, longest just below the apical cavity . . CLXIII. *Rhyncholaba*
Scaling longest proximally . . . . CLXII. *Theretra*.

i. First segment of palpus strongly convex at apex on outerside, bearing a transverse crest of scales, or a fringe of hairs along eye . CLX. *Basiothia*.
First segment of palpus not obviously convex at apex . . . . . CLXI. *Hippotion*.

j. Second segment of palpus with apical tuft on innerside . . . . . CLIV. *Phanoxyla*.
Second segment of palpus without apical tuft on innerside . . . . . *k*.

k. Second segment of palpus on outerside with a lateral crest as a continuation of the eyelashes . . . . . CLVII. *Rhodafra*.

Without this crest . . . . . *l.*

l. Palpus rough with long dispersed hairs . . CLVI. *Pergesa.*

Palpus without these hairs, or with very few . . . *m.*

m. Antenna setiform . . . . . CLIII. *Xylophanes.*

Antenna distinctly incrassate distally . . CLV. *Celerio.*

CLIII. XYLOPHANES.—Typus : *anubus.*

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Theretra Hübner, *Verz. bek. Schm.* p. 135 (1822) (partim ; type : *nessus=equestris*).
Isoples id., *l.c.* (1822) (partim ; type : *eson*).
Xylophanes id., *l.c.* (1822) (partim ; type : *anubus*).
Orcus id., *l.c.* p. 136 (1822) (partim ; type : *guoma=batus*).
Charrocampa, Harris (*non* Duponchel, 1835), in Sillim. *Journ. Sc. Art* xxxvi. p. 300 (1839).
Metopsilus Duncan, in Jard., *Nat. Libr.* xxxvii. p. 99 (1843) (*non* 1836, type : *merii*).
Philampelus Burmeister (*non* Harris, 1839), *Sphing. Bras.* p. 58 (1856).
Calliomma Walker, *List Lep. Ins. B. M.* viii. p. 108 (1856) (partim ; type : *nomius*).
Charrocampa, id., *l.c.* p. 125 (1856) (partim).
Pergesa id., *l.c.* p. 149 (1856) (partim ; type : *parcellus*).
Darapsa id., *l.c.* p. 182 (1856) (partim ; type : *choerilus = pholus*).
Eucheryx Boisduval, *Spec. Gén. Lép. Hét.* i. p. 219 (1875) (partim ; type : *licastus*).
Deilonche Grote, *Hawk Moths N. Am.* p. 30 (1886) (type : *tersa*).
Gonenyo, Rothschild, *Iris* vii. p. 298 (1894).

♂ ♀. Palpus simple externally, no indication of a cavity in the scaling at the end of the first segment ; on the innerside the scaling at the end of the first segment quite irregular, not dense, and second segment without brush of hair-scales at upper angle. Antenna slender, not incrassate distally ; hook rather long and gradual ; antenna of ♀ often with seriated ciliae. Eye-lashes vestigial or distinct. Spines of abdominal tergites numerous, small and weak ones mixed with strong ones, or, on the last segments, only one row of long and strong conical spines (*chiron*, *tersa*, etc.). Spurs of hindtibia always unequal, the outer one short ; spurs of midtibia unequal or equal, the outer one shorter or *longer* than, or as long as, the inner one, the relative length varying sometimes in the same species. Midtarsal comb generally distinct, that of hindtarsus less obvious, but the spines found to be somewhat prolonged when the scales are removed. Pulvillus always large ; paronychium with two pairs of long lobes.

♂. Tenth tergite simple, truncate-sinuate at end, divided into two processes in *chiron* ; sternite boat-shaped, transversely ribbed above at end. Clasper broadly sole-shaped ; friction-scales large, few in number as a rule, but sometimes numerous and rather small ; harpe ending in a generally small process. Penis-sheath with dorso-apical edge incrassate, developed to a dentate ridge which is produced into one or two processes in most species, one right, the other left.

♀. There is no special armature in the ♀, the vaginal plate being simple, triangular.

Larvae, as far as they are known, tapering in front ; with one or more ocelli.—Food-plants : *Rubiaceae* as a rule.

Pupa : tongue-case not very prominent.

Hab. America.

Fifty species.

The genus is a very natural one. It is found only in America, and all the American species belong to it,* no representative of the allied Old World genera

* *Hystrix* is so aberrant that we have to put it into a genus of its own.

Theretra, *Hippotion*, etc., occurring in the Nearctic and Neotropical Regions. There is no question of mistaking an American species for an Old World one (or the reverse), if the palpi are examined.

The development of the midtibial spurs is most peculiar in so far as the inner spur is in many species obviously shorter than the outer one, while normally the outer spur is the shorter. This abnormal relation of length is due to the reduction of the inner spur. Some species are very interesting in this respect, showing individual and sometimes geographical variation in the length of the spurs (*amadis*, *nechus*, etc.).

The venation of the hindwing is not quite constant in the genus, the position of the cross-veins and the central veins being affected by the obvious difference in the shape of wing observed in some more distantly related species (compare for instance *tersa*, *pistacina*, *depuiseti*). SC^2 and R^1 are sometimes stalked (*ceratomioides*, etc.).

Key to the species :

a. Lines of forewing transverse, their posterior parts not close together in middle of inner margin, never longitudinal ; pale band of hindwing not separated into spots . . . . . *b*.

Lines of forewing oblique, more or less converging towards apex of wing . . . . *p*.

b. Band of hindwing ochre-yellow . . . 624. *X. pluto*.

Band of hindwing not ochre-yellow . . . *c*.

c. Body and forewing ferruginous or uniformly pale cinnamon-rufous . . . . . *d*.

Body and forewing not so coloured . . . . *e*.

d. Forewing with more than one line, hindwing with conspicuous creamy patch or band . . . . . 627. *X. rufescens*.

Only one distinct line on forewing ; hindwing without creamy patch . . . 628. *X. irrorata*.

e. First discal line of forewing forming a heavy band which is more or less straight, gradually shading off distally, while being rather sharply defined proximally . . *f*.

First discal line thin, often indistinct . . . *g*.

f. Bright greyish green above, hindwing black with green band . . . . 625. *X. tyndarus*.

Dirty greenish buff, band of hindwing this same colour . . . . . 626. *X. pistacina*.

g. Abdomen with an isolated black basi-lateral patch, wings without green . . . 630. *X. rhodocera*.

Abdomen without an isolated black basi-lateral patch . . . . . *h*.

h. Inner edge of forewing white except at base ; fringe of hindwing even, without sharply marked dots . . . . . *i*.

Inner edge of forewing not white; fringe of hindwing with distinct vein-dots . . . *j.*

i. Forewing with a small apical patch, three or four discal lines followed by a row of dots; pale band of hindwing very obscure but continued to R^2 or further costad . . . . . 632. *X. schausi.*

Forewing without apical patch, discal lines indistinct . . . . . 631. *X. porcus.*

j. Discal lines of forewing dentate . . . . *k.*

Discal lines of forewing not dentate, except second, ground-colour green, fringe of hindwing with conspicuous white dots . . . *n.*

Only one line present, ground-colour green; fringe of hindwing not distinctly spotted 629. *X. gundlachi.*

k. Forewing without green, abdomen without middle line . . . . . *l.*

Forewing with green, abdomen with middle line . . . . . *m.*

l. External spur of midtibia longer than internal . . . . . 633. *X. germen.*

External spur of midtibia shorter than internal . . . . . 634. *X. juanita.*

m. Distal margins of wings not dentate: hindwing without distinct yellow band . 635. *X. fusimacula.*

Distal margins dentate; hindwing with yellow band . . . . . 636. *X. zurcheri.*

n. Stigma of forewing black . . . . . *o.*

Stigma of forewing white . . . . 623. *X. ploetzi.*

o. Forewing with black submarginal patch R^2—R^3 . . . . . 622. *X. adalia.*

Forewing without black submarginal patch R^2—R^3 . . . . . 621. *X. depuiseti.*

p. Hindwing black, with a large pale subbasal mesial patch, besides a discal band, or all creamy buff with a discal and a submarginal black band . . . . *q.*

Hindwing without pale subbasal mesial patch, basal area not creamy . . . . *r.*

q. Hindwing creamy, base not black . . 640. *X. falco.*

Hindwing black at base, with large pale subbasal mesial patch . . . . . *r.*

r. Distal margins of wings distinctly scalloped; forewing below with a straight and narrow pale band between R^3 and SM^2, dorsal lines of abdomen parallel . . 644. *X. guianensis.*

Distal margins entire or very faintly scalloped; pale band on underside of forewing undulate or vestigial . . . . *s.*

s. Forewing, above, with a distinct black costal spot about 12 mm. from apex . 643. *X. ceratomioides.*
This spot vestigial . . . . . . *t.*

t. Disc of fore- and hindwing, below, russet-cinnamon, forewing with five well-marked lines below, line 4 feebler on disc; dorsal lines of abdomen converging basad on each segment . . 642. *X. media.*
Disc of fore- and hindwing, below, much redder, with a buff space on forewing between R^2 and SM^2; dorsal lines of abdomen parallel . . . . . 641. *X. xylobotes.*

v. Forewing, above, with a single prominent line from near base at inner margin to apex, bordered proximally with pale scaling, the other lines indistinct . . . . *w.*
Forewing with a greater number of distinct lines . . . . . *y.*

w. Abdomen with dark mesial line . . 646. *X. docilis.*
Abdomen without mesial line . . . . *x.*

x. Line of forewing midway between tip and base of SC^5 . . . . . 648. *X. epaphus.*
Line of forewing much nearer tip than base of SC^5 . . . . . 647. *X. amadis.*
Line of forewing ending at apex . . 650. *X. rothschildi.*

y. Hindwing with a prominent band of mostly triangular or ovate spots . . . . . *z.*
Band of hindwing not interrupted, or absent . . *g'.*

z. Head and thorax without pale lateral stripe 662. *X. hydrata.*
Head and thorax with pale lateral stripe . . *a'.*

a'. Abdomen with distinct black basal lateral patch . . . . . *d'.*
Abdomen without black basal lateral patch . . *b'.*

b'. Discal lines of forewing four in number, indistinct, ending in or near a brown or black patch, situated at hinder margin near angle of wing . . . . 651. *X. chiron.*
No brown patch at inner margin near angle . . *c'.*

c'. Abdomen yellowish at sides, with dorsal lines; 7 or 8 lines in outer half of forewing . 657. *X. tersa.*
Abdomen not paler at sides than above, no dark dorsal lines; lines of forewing reduced in number . . . . 658. *X. suana.*

d'. The upper spots of the hindwing, above, merged together, nearer cell than outer margin . . . . . 645. *X. anubus.*
The upper spots more or less completely separate, much nearer outer margin than cell . . . . . *e'.*

e'. Abdomen with two very sharply marked grey dorsal lines, which are about 2 mm. distant from each other in middle of abdomen . . . . . 655. *X. titana.*

These lines close together, or fused to one single stripe, or absent . . . . . f'.

f'. One broad grey mesial stripe on abdomen, or no line; midtibial spurs unequal . 652. *X. crotonis.*

This stripe distinct only on basal segments; discal line 1 of forewing heavier than line 4 . . . . . 656. *X. resta.*

Two sharply marked lines which stand close together . . . . . 654. *X. eumedon.*

No distinct dorsal lines on abdomen; midtibial spurs equal; underside of wings red . . . . . 653. *X. rhodochlora.*

g'. Upperside of body and wings green, basal half of hindwing black . . . . 660. *X. elara.*

Colour different . . . . . h'.

h'. All the discal lines of forewing sharply dentate, composed of lunules . . . . i'.

At least the first line even . . . . j'.

i'. Outer margins of wings not dentate; no distinct band on hindwing . . . 635. *X. fusimaenla.*

Outer margins dentate, a distinct band on hindwing . . . . . 637. *X. undata.*

j'. A sharply marked pale line on SC⁵ of forewing, and a pale stripe from base to apex bordering a chestnut costal area . . . . . 670. *X. thyelia.*

Forewing not so . . . . . k'.

k'. Discal lines 1 and 2 of forewing forming a band which reaches tip of wing; lines 4 and 5 not prominent . . . 659. *X. turbata.*

Discal lines 1 and 2 not reaching tip of wing . . . . . l'.

l'. Discal lines 1 and 2 forming a prominent band which is abbreviated in front, and lines 4 and 5 another which reaches apex but is evanescent behind . . 663. *X. robinsoni.*

Forewing not so marked . . . . . m'.

m'. Underside of wings and body and stripe from base of forewing to palpus red; upperside of forewing green, with silky grey interspaces . . . . . 649. *X. belti.*

Forewing above not green; pale band of hindwing indistinct or absent . . . . n'.

Forewing above not green; pale band of hindwing distinct . . . . . q'.

n'. Forewing above with a number of thin parallel lines before hinder margin close together	. .	*p'*.
Without this bundle of lines	658.	*X. suana.*
p'. Border of fore- and hindwing below connected with basi-discal area	639.	*X. godmani.*
Border of fore- and hindwing not connected with basi-discal area	638.	*X. rhodina.*
q'. Mesothoracic tegula with a blackish dorsal border which extends to palpi	665.	*X. maculator.*
Mesothoracic tegula without this border	.	*r'*.
r'. Forewing with seven lines in outer half, line 7 indistinct, line 4 the heaviest	.	*s'*.
Forewing with eight lines in outer half, line 5 the heaviest	.	*t'*.
s'. Distal marginal border of forewing below feebly marked; lines 1 and 2 of forewing above forming a prominent band	661.	*X. isaon.*
Distal marginal border well marked, strongly angulate behind R^2	664.	*X. damocrita.*
t'. Discal lines 1 to 6 of forewing close together, all thin	666.	*X. aglaor.*
Discal line 5 obviously broader than the others	.	*u'*.
u'. Band of hindwing bright red	669.	*X. neoptolemus.*
Band of hindwing pale red or buff	.	*v'*.
v'. Band of hindwing reaching costa; distal marginal border of forewing below not distinctly angulate behind R^2	668.	*X. loelia.*
Forewing below more buff, not reaching costa; distal marginal band of forewing below sharply angulate behind R^2.	667.	*X. libya.*

621. Xylophanes depuiseti.

†*Eucheryx depuiseti* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 222. n. 4 (1875) (Brazil;—coll. Charles Oberthür); Butl., *Trans. Zool. Soc. Lond.* ix. p. 631 (1877).

Calliomma depuiseti, Kirby, *Cat. Lep. Het.* i. p. 647. n. 11 (1892); Bönningh., *Iris* xii. p. 123. n. 43 (1899) (Rio).

This and the next two species agree closely in appearance. The upperside of the forewing and body is green, more or less olivaceous. The fringe of the hindwing and that of the forewing behind is conspicuously dotted with white, giving the wing the appearance of being dentate, while it is in fact only very feebly sinuous. The antenna of the ♀ is somewhat compressed and shows vestiges of seriate ciliae at the bases of the segments. Exterior spurs of midtibia shorter than interior, or nearly the same in length.

♂♀. In *depuiseti* the abdomen bears two dorsal rows of very feeble brown dots and on each side a row of pale, more or less golden, apical dots.——Forewing: two antemedian lines, external one or both vestigial; stigma black: three parallel discal lines, thin, curving costad in front, the second feeble, the third accentuated

by minute vein-dots ; oblique apical line barely vestigial ; a trace of a postdiscal line behind, ending at hinder angle.

♂. Tenth abdominal tergite of the same type as in *pistacina* and allied species, rather broader than in *pluto*, truncate, very feebly sinuate ; sternite narrow, transversely ribbed above. Friction-scales of clasper rather numerous ; process of harpe simple, slender, with vestiges of notches at end, short, compressed distally and somewhat twisted, gently curved upwards. Penis-sheath (Pl. LVII. f. 1) resembling that of *pistacina* : a right pointed process without dentition, and a narrow left dentate lobe.

Early stages not known.

Hab. Brazil : Espirito Santo to Santa Catharina.

In the Tring Museum 5 ♂♂ from Espirito Santo and Santa Catharina.

622. Xylophanes adalia.

**Calliomma adalia* Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 6. n. 3. t. 2. f. 1 (1881) (Chiriqui ;—coll. Staudinger) ; Kirby, *Cat. Lep. Het.* i. p. 647. n. 13 (1892).

♂ ♀. The lines of the forewing more distinct than in *depuiseti*, especially the oblique apical one ; a black patch between R^2 and R^3 outside discal line 4, fringe white-spotted to apex of wing, which is less produced than in *depuiseti*, margin not distinctly sinuous between R^3 and SM^2. Underside of body and wings more golden-yellow.

♂. Process of harpe shorter than in *depuiseti*. Penis-sheath differently armed : the dorsal apical edge beset with teeth (Pl. LVII. f. 2), a left, narrow process, near the base of which stand some more teeth corresponding to the left lobe of the preceding species, the dentition quite variable in detail ; a short tooth projecting dextro-laterad corresponds to the right-side process of *depuiseti*.

Early stages not known.

Hab. Chiriqui, Panama ; probably more widely distributed.

In the Tring Museum 4 ♂♂, 1 ♀ from Chiriqui.

623. Xylophanes ploetzi.

**Choerocampa* (?) *ploetzi* Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 350. t. 4. f. 35 (1876) (Surinam ;—*type*, ♂, in coll. Staudinger).

**Calliomma drucei* Rothschild, Nov. Zool. i. p. 73 (1894) (R. Demerara ;—Mus. Tring) : id., *l.c.* iii. t. 13. f. 7 (♀) (1896).

♂ ♀. Underside of body and wings yellowish green. Abdomen above with a thin mesial line. Lines of forewing as distinct as in *adalia*, apical one less so, no postdiscal patch R^2—R^3, stigma *white*, fringe with white dots between R^3 and SM^2. Underside of wings without russet-ferruginous scaling, the marginal areas of both wings a little more greenish than the disc, that of hindwing shaded with olive.

Not dissected.

Hab. Surinam ; British Guiana.

In the Tring Museum 1 ♀ from : Rio Demerara.

624. Xylophanes pluto.

Sphinx pluto Fabricius, *Gen. Ins.* p. 274. n. 22 23 (1777) (Amer. mer.) ; Goeze, *Ent. Beytr.* iii. 2. p. 209. n. 25 (1780) ; Fabr., *Spec. Ins.* ii. p. 148. n. 40 (1781) ; Zschach, *Mus. Lesk.* p. 95. t. 3. n. 184 (1788) ; Gmel., *Syst. Nat.* i. 5. p. 2386. no. 161 (1790).

Sphinx boerhaviae Fabricius, *Mant. Ins.* ii. p. 96. n. 43 (1781) (partim) ; Gmel., *Syst. Nat.* i. 5. 2381 n. 77. *β* (1790).

Sphinx croesus Dalman, *Anal. Ent.* p. 48. n. 22 (1823).

Orens thorates Hübner, *Zutr. Samml. Ex. Schm.* iii. p. 30. f. 525. 526 (1825) (Antilles).

Calliomma pluto, Walker, *List Lep. Ins. B. M.* viii. p. 111. n. 3 (1856) (sub syn.); Kirby, *Cat. Lep. Het.* i. p. 646. n. 10 (1892) (= *thorates* = *croesus*); Hamps., *Ann. Mag. N. H.* (7). vii. p. 251 (1901) (Nassau).

Chaerocampa eson, Walker, *l.c.* p. 137. n. 17 (1856) (sub syn.).

Pergesa thorates, id., *l.c.* viii. p. 151. n. 2 (1856); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 145. n. 25 (1859); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 166. n. 1 (1862); Grote, *Proc. Ent. Soc. Philad.* v. p. 49 (1865); id. & Rob., *ibid.* v. p. 154. n. 35 (1865) (Cuba); Grote, *l.c.* vi. p. 328 (1867); id., *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (Cuba); Gundl., *Contr. Ent. Cubana* p. 198 (1881) (descr. of larva & pupa).

Chaerocampa thorates, Lucas, in Sagra, *Hist. Cuba* vii. p. 294 (1856) (Cuba; St. Thomas).

Eucheryx croesus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 221. n. 3 (1875) (= *thorates*); Möschl, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 350 (1876) (Surinam).

Calliomma thorates, Butler, *Trans. Zool. Soc. Lond.* ix. p. 540. n. 8 (1877) (Haiti; St. Thomas; St. Vincent; Oaxaca); Maass., *Stett. Ent. Zeit.* xli. p. 54 (1880) (= *croesus* = *pluto*); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 5. n. 2 (1881) (Mexico; Guatemala; Panama); id., *l.c. Suppl.* p. 301 (1896) (Mexico; Costa Rica; Chiriqui; Guatemala).

Calliomma croesus, Bönninghausen, *Iris* xii. p. 123. n. 42 (1899) (Rio de Jan.).

♂♀. Basal ciliae of antennal segments of ♀ very feebly prolonged. External spur of midtibia *longer* than internal. Spines of abdominal tergites uniseriate. The green colour of the thorax and forewing often fading to russet or ferruginous. Abdomen with a thin mesial line, interrupted at the bases of the segments by metallic yellow dots, another line laterally; underside of thorax and abdomen more or less maize-yellow, with metallic yellow scales; a few such scales also dorso-laterally.——Forewing: a subbasal patch or band, 4 or 5 antemedian lines; first discal line straight, curved costad anteriorly, second line mostly absent, third and fourth evenly dentate; apical line curved, even, ending in a patch at R^2, followed by a dentate line; the basal and disto-marginal interspaces more or less shaded with silvery grey. The ochre-yellow band of the hindwing distinguishes *pluto* from all the other American *Xylophanes*.

♂. Friction-scales of clasper few in number, large, truncate, midrib prominent. Tenth tergite very narrow, truncate-sinuate; sternite with parallel sides, rounded at end, upperside concave, transversely ribbed, middle line somewhat raised. Process of harpe curved as in *pistacina*, but somewhat stouter, not narrowed to end, with some teeth before tip. Penis-sheath peculiar: a right dentate lobe, and a left ridge bearing the teeth at the distal edge (Pl. LVII. f. 3. 4), this dentition recalling the armature of *adalia*.

Larva described by Gundlach, *l.c.*; a dark and a pale form, both with an ocellus on the fourth segment.—Food-plant: *Erythroxylon*.

Hab. Neotropical Region: Bahamas, Florida, southward over the Antilles and the Continent to Southern Brazil.

In the Tring Museum 80-odd specimens from: Cuba; Haiti; Nassau, Bahamas (Sir G. Carter); Florida; Mexico; southward to Peru and South Brazil.

625. Xylophanes tyndarus.

**Chaerocampa tyndarus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 264. n. 51. t. 4. f. 5 (1875) (Brazil:—coll. Charles Obertbür); Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 306. n. 13 (n) (1896) (Mexico; Honduras); Kaye, *Trans. Ent. Soc. Lond.* p. 138 (1901) (Trinidad).

Chaerocampa tyndarus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 631 (1877).

Darapsa tyndarus, Kirby, *Cat. Lep. Het.* i. p. 671. n. 6 (1892).

Darapsa (*Chaerocampa*) *tyndarus*, Rothschild, *Nov. Zool.* i. p. 84 (1894) (Venezuela; Trinidad; Costa Rica).

Theretra tyndarus (!), Bönninghausen, *Iris* xii. p. 129. n. 59 (1899) (Rio de Jan.)

♂♀. Structurally almost the same as *pistacina*. Body and wings greyish olivaceous green, often very bright; underside of body whitish green.

Wings, *above*.——Forewing: three antemedian lines, the two distal ones close together; first discal line heavy, straight, gradually shading off externally, second and third line not marked, line 4 distinct anteriorly though weak, more or less obviously joining the postdiscal cloud between R^1 and R^3, some very small vein-dots forming a continuation of the line, oblique apical line short, often not reaching the postdiscal cloud. The green band of the hindwing not reaching costal margin, the distal margin also often green, in which case the black submarginal band is reduced. The oblique apical line of forewing, below, forms an angle behind R^2 with the irregularly undulate postdiscal line, the marginal area bordered by these lines as broad as in *schausi*.

♂. Genital armature not apparently different from that of *pistacina*, except that the harpe is rather stouter, less curved, and dentate at end, and the proximal edge of the left process of the penis-sheath more regularly and strongly dentate.

Early stages not known.

Hab. Neotropical Region, exclusive of the West Indies, from Mexico to Southern Brazil.

In the Tring Museum 8 ♂♂, 8 ♀♀ from: Jalapa and Orizaba, Vera Cruz, Mexico, iii. iv. (Schaus); Aroa, Venezuela.

A small ♂ from Theresopolis in the British Museum is on the underside more yellow and has no discal line, the apical line of the forewing is less oblique; the tenth abdominal sternite is also narrower and is pointed.

626. **Xylophanes pistacina** (Pl. IX. f. 11, ♂).

**Philampelus pistacina* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 199. n. 8 (1877) (Minas Geraës —coll. Charles Oberthür); Butl., *Trans. Zool. Soc. Lond.* ix. p. 630 (1877).

**Calliomma diogenes* Maassen, *Stett. Ent. Zeit.* xli. p. 54 (1880) (hab. ?;—Mus. Berlin); Kirby, *Cat. Lep. Het.* i. p. 646. n. 9 (1892).

**Choerocampa jocasta* Druce, *Ann. Mag. N. H.* (6). ii. p. 237 (1888) (Guatemala;—coll. Staudinger); id., in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 306. n. 13 (b). t. 65. f. 6 (1896) (Mexico; Guatemala; Peru).

Theretra jocasta, Kirby, *Cat. Lep. Het.* i. p. 658. n. 106 (1892).

Ambulyx? pistacina, id., *l.c.* p. 674. n. 1 (1892).

Theretra pistacina, Schaus, *Ent. News* ix. p. 135 (1898) (= *jocaste*).

♂♀. Basal ciliae of antennal segments of ♀ distinctly prolonged. External spur of midtibia somewhat *shorter* than internal one. No lines on abdomen. Forewing: antemedian lines vestigial, the two distal ones forming a band at apex of cell, angulated at M^1; the two proximal discal lines more or less merged together to a band, the inner line often straight; third discal line very feebly marked; fourth rather more distinct, generally accentuated by vein-dots, lines 2 to 4 dentate; line 5 from apex curved, continuous with a greenish olive patch R^2—R; ground-colour variable, the wing being occasionally much greener than in ordinary individuals. Pale band of the hindwing much suffused with olive-brown. Brown border of underside of forewing broad, less angulate behind R^2 than in *schausi*.

♂. Tenth tergite truncate-sinuate; sternite rounded at end. Process of harpe long, very slender, pointed, somewhat curved twice, as in *schausi*. Penis-sheath: right process short, pointed; left one also short, dentate, less projecting than in *schausi*.

Early stages not known.

Hab. Neotropical Region, exclusive of the Antilles, from Mexico to Southern Brazil and Paraguay.

In the Tring Museum 11 ♂♂, 3 ♀♀ from: Honduras; Paraguay (Dr. Bohls); Rio de Janeiro; Bauru, S. Paulo (Dr. Hempel).

627. Xylophanes rufescens.

**Theretra rufescens* Rothschild, Nov. Zool. i. p. 75. t. 6. f. 11 (♀) (1894) (British Guiana;—Mus. Tring).

♂♀. A large-eyed species. Antenna of ♀ compressed, with basal rows of prolonged ciliae. External spur of midtibia shorter than internal.——Brownish ferruginous; forewing with a buffish ground which is densely shaded and irrorated with brownish ferruginous; hindwing black, a creamy submarginal band shaded with black, abbreviated in front, not reaching beyond R^3, dilated basad upon SM^2, followed by a marginal patch at anal angle; both wings ferruginous below.

♂. Tenth abdominal tergite gradually and not strongly narrowed to end, truncate, feebly sinuate, slightly dilated at end; sternite triangular, curved in side-view, strongly convex below, apex obtusely pointed. Process of harpe horizontal, cylindrical from middle to end, extreme end curved upwards and armed with teeth. Dorsal margin of penis-sheath produced dextro-laterad into a rather long horizontal process, dentate on the proximal side, the edge sinistro-laterally continued as an oblique, slightly raised ridge, which bears some rather prominent teeth (Pl. LVII. f. 11).

Early stages not known.

Hab. Neotropical Region: British Guiana; Amazons; Peru.

In the Tring Museum 1 ♂, 6 ♀♀ from: British Guiana; Venezuela; Carabaya, Inambari R., S.E. Peru, 3000 ft., April 1901, dry season (Ockenden).

In coll. Charles Oberthür from S. Paulo d'Olivença, Amazons.

628. Xylophanes irrorata.

Chaerocampa spec., Herrich-Sch., *Corresp. Bl.* iii. p. 58 (1865) (Cuba).

Chaerocampa irrorata Grote, *Proc. Ent. Soc. Philad.* v. p. 52. t. 1. f. 2 (♂) (1865) (Cuba); id. & Rob., *ibid.* v. p. 154. n. 37 (1865); Butl., *Trans. Zool. Soc. Lond.* ix. p. 564. n. 65 (1877); Gundl., *Contr. Ent. Cubana* p. 195 (1881).

Choerocampa irrorata Grote, *l.c.* vi. p. 328 (1867) (Cuba); id., *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (Cuba); Boisd., *Spec. Gén. Lép. Hét.* i. p. 278. n. 74 (1875) (Cuba).

Everyx irrorata, Kirby, *Cat. Lep. Het.* i. p. 674. n. 5 (1892).

♂. Upper and under surface of body and wings uniformly pale cinnamon-rufous, underside paler than upper. White lateral border of mesothoracic tegula continued to end of palpus. A darker cinnamon-rufous line on forewing, a little nearer distal margin than cell, with a pale proximal border. Basal area of hindwing olive-brown. External spur of midtibia shorter than internal.

♂. Tenth abdominal tergite gradually narrowed, apex convex above, truncate-sinuate; upper surface of sternite transversely folded distally, apex rounded-truncate. Process of harpe (Pl. LIII. f. 3) compressed, short, elongate-triangular, somewhat like the blade of a pointed knife. Process of penis-sheath (Pl. LVII. f. 10) projecting distad at base, the free part somewhat fin-shaped and dentate, curving proximad and sinistro-laterad; this process is the left one of other species, there being no right process in *irrorata*.

Larva mentioned by Gundlach as feeding on *Psychotria*; not described.

Hab. Cuba; Bahamas; doubtless also on Haiti.

In the Tring Museum 2 ♂♂ from: Cuba; Abaco, Bahamas (Sir G. Carter).

629. Xylophanes gundlachi.

**Chaerocampa gundlachi* Herrich-Sch., *Corresp. Bl.* p. 149 (1863) (Cuba;—coll. Staudinger); id., *l.c.* p. 58 (1865); Grote, *Proc. Ent. Soc. Philad.* v. p. 51 (1865) (Cuba); id. & Rob., *ibid.* v. p. 154. n. 36 (1865); Butl., *Trans. Zool. Soc. Lond.* ix. p. 564. n. 64 (1877); Gundl., *Contr. Ent. Cubana* p. 194 (1881).

Choerocampa gundlachi, Grote, *l.c.* vi. p. 328 (1867); id., *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) (Cuba); Boisd., *Spec. Gén. Lép. Hét.* i. p. 277. n. 73 (1875).

Darapsa gundlachi, Kirby, *Cat. Lep. Het.* i. p. 671. n. 4 (1892).

♂ ♀. Resembling *rhodocera* in the shape of the wings. Abdomen almost unicolorous, without markings, paler below than above, green. Forewing, above, brown at base; one discal line, which is green and ends in a brown spot at hinder margin; costal edge and fringe reddish, the latter brownish behind and here with a very few white scales; stigma black with white centre, small; fringe of hindwing pale, not distinctly spotted. Underside of forewing in basal three-fifths brown like upperside of hindwing.

♂. Harpe similar to that of *rhodocera*, irregularly dentate distally. Penis-sheath (Pl. LVII. f. 9) with a rather long truncate right process and a short left one.

Early stages not known.

Hab. Cuba (doubtless also on Haiti).

In the Berlin Museum 1 ♂; in coll. Staudinger 1 ♂ (*type*, ex coll. Herrich-Schäffer).

630. Xylophanes rhodocera.

**Darapsa rhodocera* Walker, *List Lep. Ins. B. M.* viii. p. 184. n. 4 (1856) (Haiti;—Mus. Brit.); Grote, *Proc. Ent. Soc. Philad.* v. p. 81 (1865); id. & Rob., *ibid.* v. p. 154. n. 34 (1865); Butl., *Trans. Zool. Soc. Lond.* ix. p. 567 (1877); id., *Illustr. Typ. Specim. Lep. Het. B. M.* i. p. 1. t. 15. f. 2 (1877); Kirby, *Cat. Lep. Het.* i. p. 671. n. 1 (1892) (Haiti).

Choerocampa rhodocera, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 276. n. 72 (1875).

♂ ♀. External spur of midtibia longer than internal one. Distal margin of forewing strongly convex; a vestige of the discal line of *irrorata*; a slightly brownish patch near end of cell; another smaller one occasionally in middle of cell; disco-marginal area dusted with brown scales, especially behind. Scaling of antenna pink. External spines of first protarsal segment very numerous in this species, and in *irrorata* and *rufescens*. Spines of abdominal tergites uniseriate.

♂. Tenth abdominal tergite long and slender, truncate, feebly sinuate; sternite slightly dilated distally, apex rounded. Process of harpe (Pl. LIII. f. 2) suddenly narrowed in middle, somewhat concave at end. Penis-sheath (Pl. LVII. f. 8) with a central process as in *irrorata*, projecting proximad, slightly curving sinistro-laterad, produced distally into a short dentate hook homologous to the right-side process of other species.

Early stages not known.

Hab. Haiti.

In the Tring Museum 2 ♂♂.

631. Xylophanes porcus.

Oreus porcus Hübner, *Samml. Ex. Schm.* ii. t. 162. f. 1—4 (1824?).

Darapsa porcus, Walker, *List Lep. Ins. B. M.* viii. p. 187. n. 10 (1856); Kirby, *Cat. Lep. Het.* i. 671. n. 2 (1892).

♂ ♀. Antenna of ♀ with very feebly prolonged ciliae near the base of the segments. External spur of midtibia obviously longer than internal. External

spines of first protarsal segment numerous only at base, reduced distally to one row. The white lateral border of the mesothoracical tegula not marked on occiput, indistinct anteriorly on pronotum, reappearing as a fine line in front of the antenna.——Forewing with a single row of dots distally on disc; a dark transverse cloud indicating another line about 3 mm. from cell at R^3, two more clouds occasionally in basal half. Abdomen without traces of lines, the distinct blackish basi-lateral patch of *rhodocera* also absent from *porcus*.

♂. Tenth abdominal tergite long and slender, apex gradually narrowed, obtusely pointed; sternite also long, feebly spatulate, apex obtusely rounded. Dorsal edge of penis-sheath projecting in the shape of a halfmoon, both horns free, pointing proximad, the right one narrow, the left one broader, dentate.

Early stages not known; larva feeding on *Hamelia patens* according to Gundlach, *l.c.*

Hab. Neotropical Region.

Two subspecies:

a. X. porcus porcus.

Orcus porcus Hübner, *l.c.*

Darapsa porcus, Walker, *l.c.*

Chaerocampa porcus, Herrich-Sch., *Corresp. Bl.* p. 58 (1865) (Cuba); Grote, *Proc. Ent. Soc. Philad.* v. p. 53 (1865) (Cuba); id. & Rob., *ibid.* v. p. 154. n 38 (1865); Butl., *Trans. Zool. Soc. Lond* ix. p. 561. n. 39 (1877); Gundl., *Contr. Ent. Cubana* p. 195 (1881).

Choerocampa porcus Grote, *l.c.* vi. p. 328 (1867); id., *Trans. Amer. Ent. Soc.* iii. p. 154. n. 38 (1871); Boisd., *Spec. Gén. Lép. Hét.* i. p. 278. n. 75 (1875).

♂ ♀. Stigma of forewing distinct. An obvious olivaceous cloud beyond apex of cell. Processes of penis-sheath slender, the left one dentate proximally, comb-like.

Hab. Cuba.

In the Tring Museum 1 ♂.

b. X. porcus continentalis subsp. nov.

Choerocampa porcus, Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 9. n. 4 (1881) (Chiriqui; Ecuador); id., *l.c. Suppl.* p. 304 (1896) (Mexico).

Theretra porcus, Bönninghausen, *Iris* xii. p. 129. n. 58 (1899) (Rio de Jan.).

♂ ♀. Stigma smaller, olive-green cloud outside cell less obvious, distal dots a little more pronounced; otherwise the same in colour as the insular form.

♂. Armature of penis-sheath obviously different from that of the insular *porcus*: the left process especially broader, more or less rounded, the right process shorter, stouter.

Hab. Continental South and Central America, as far south as Sta. Catharina.

Type from Colombia.

In the Tring Museum 13 ♂♂, 8 ♀♀ from: Sta. Catharina; Rio de Janeiro; Espirito Santo; Minas Geraës, xi. (Kennedy); Aroa, Venezuela; Rio Dagua, Colombia, *type* (Rosenberg); Costa Rica; Orizaba and Jalapa, Mexico, ii. iii. iv. (Schaus).

632. **Xylophanes schausi** (Pl. IX. f. 13, ♀, *type*).

**Darapsa schausi* Rothschild, Nov. Zool. i. p. 84 (1894) (Petropolis;—Mus. Tring).

**Theretra arpi* Schaus, *Ent. News* ix. p. 135 (1898) (Rio de Janeiro;—coll. Schaus).

Theretra spec. B., Bönninghausen, *Iris* xii. p. 129. n. 60 (1899) (Rio de Janeiro).

♂ ♀. Antenna of ♀ prismatically compressed, basal rows of ciliae prominent. External spur of midtibia much shorter than internal. White lateral border of

mesothoracic tegula continued to palpus. No lines on abdomen. Distal margin of forewing strongly convex; discal lines dentate, the two proximal ones faint, but traceable from costal to inner margin, the third barely indicated, the fourth marked by dots on the veins; an apical halfmoon SC^4—SC^5, generally continuous with a weak oblique line, which ends at a patch or cloud between R^1 and R^2. The pale band of the hindwing always much shaded with olive. The oblique apical band of the underside of the forewing, bordering the marginal band, about 7 mm. distant from outer margin at R^2, the band then suddenly narrower.

♂. Tenth tergite narrowed to middle, then very faintly widened to apex, which is truncate-sinuate; sternite of the usual type, rounded at end, mesially very faintly pointed. Process of harpe long, cylindrical, somewhat ∿-shaped. Penis-sheath (Pl. LVII. f. 5) with an acute right process and a left dentate lobe.

Early stages not known.

Hab. Brazil, Province Rio de Janeiro; Venezuela (doubtless more widely distributed in South America).

In the Tring Museum 4 ♂♂, 2 ♀♀ from: Petropolis, Rio de Janeiro; Espirito Santo; Aroa, Venezuela.

633. Xylophanes germen.

**Calliomma germen* Schaus, *Ent. Amer.* vi. p. 20 (1890) (Coatepec, Mexico;—coll. Schaus); Kirby, *Cat. Lep. Het.* i. p. 647. n. 12 (1892); Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 301. n. 5. t. 66. f. 10 (1896) (Mexico).

♂♀. Antenna of ♀ with prolonged basal ciliae to the segments. External spur of midtibia much longer than internal. Distal margin of forewing more or less dentate, sometimes nearly even, apex acute, prominent; two indistinct antemedian lines; discal lines dentate, not clearly defined as a rule. Fringe of hindwing white, interrupted at the veins. The lateral border of mesothorax somewhat pinkish in front. Scaling of antenna pink mesially, black laterally. Size variable.

♂. Tenth abdominal tergite rounded at tip, sinuate; sternite boat-shaped in side-view, apex rounded: the segment essentially as in *irrorata*, *rufescens*, and many others. Process of harpe horizontal, curved upwards at end, cylindrical, with apex somewhat concave, minutely dentate or notched before end, tip simple or bifid. Penis-sheath (Pl. LVII., f. 7): a right and a left process; not identical in the two individuals examined.

Early stages not known.

Hab. Mexico to Ecuador and Venezuela.

In the Tring Museum 4 ♂♂, 1 ♀ from: Jalapa, Mexico, iv. (Schaus); Colombia; Merida, Venezuela (Briceno).

In coll. Dognin 1 ♂ from Loja, Ecuador.

634. Xylophanes juanita nom. nov.

**Perigesa mexicana* Schaus (*nom* Erschoff, 1876), *Ent. Amer.* vi. p. 20 (1890) (Paso de San Juan, Vera Cruz;—coll. Schaus); Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 303. n. 1. t. 68. f. 3 (1896).

Darapsa mexicana, Kirby, *Cat. Lep. Het.* i. p. 671. n. 8 (1892).

♂. External spur of midtibia a little shorter than the internal. First row of first and second protarsal segments irregularly doubled. Scales of antenna blackish brown, more or less pink basi-laterally. Abdomen with two rows of dots representing the dorso-lateral lines of other *Xylophanes*. As in *germen* no very conspicuous

lateral border to the tegulae, the border becoming pinkish in front, continued to base of antenna.——Forewing : traces of one or two antemedian lines, four transverse discal lines, 1 and 2 distinctly undulate, 3 and 4 faint, but 4 accentuated by dots on veins, followed by a patch at R^2, an indistinct apical line.——Hindwing darker brown than forewing, becoming paler behind, fringe white, minutely interrupted at veins. *Underside* with the series of vein-dots across both wings as in the allied species.

♂. Sexual armature of the same type as in the other species of the genus. Tenth abdominal tergite rather broad basally, narrowed to middle, apex rounded, feebly sinuate ; sternite rounded at end, very feebly angulate in middle of apical margin (in the single specimen examined). Process of harpe (Pl. LIII. f. 1) slender, somewhat spoon-shaped. Penis-sheath (Pl. LVII. f. 6) with a right curved process and a left dentate lobe.

Early stages not known.

Hab. Vera Cruz, Mexico.

In coll. Schaus, coll. Druce, and coll. Dognin.

635. Xylophanes fusimacula.

**Pergesa fusimacula* Felder, *Reise Novara, Lep.* p. 8. t. 76. f. 4 (♀) (1874) (Brasilia ;—Mus. Tring): Butl., *Trans. Zool. Soc. Lond.* ix. p. 549. n. 14 (1877).
Sphinx fusimacula, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 118. n. 60 (1875).
Philampelus (?) *fusimacula*, Kirby, *Cat. Lep. Het.* i. p. 669. n. 10 (1892).

♀. Basal ciliae of antennal segments shorter than the segments are long. Outer spur of midtibia about one-fifth shorter than the inner one. Body similarly striate with long pale scales as in *ceratomioides*. Discal lines of the forewing consisting of lunules.

♂ and early stages not known.

Hab. Brazil ; Peru.

In the Tring Museum 2 ♀♀ from : Brazil (*type*, ex coll. Felder) ; Cuzco, Peru.

636. Xylophanes zurcheri.

**Calliomma zurcheri* Druce, *Ann. Mag. N. H.* (6). xiii. p. 352 (1894) (Costa Rica ;—Mus. Brit.) ; id., *Biol. Centr. Amer., Lep. Het. Suppl.* p. 301. n. 6. t. 66. f. 2 (1896).

♂ ♀. External spur of midtibia shorter than internal. Basal ciliae of antennal segments feebly prolonged. Markings of wings agreeing more with those of *fusimacula* than of *undata* ; outer margins dentate.

Not dissected.

Early stages not known.

Hab. Costa Rica.

637. Xylophanes undata nom. nov.

**Goneuyo irrorata* Rothschild (*non* Grote, 1865), *Iris* vii. p. 298. n. 4. t. 7. f. 3 (1894) (Chuchuras, Peru ;—coll. Staudinger).

♀. Ciliae of antenna somewhat shorter than in the preceding species. Spurs of hindtibia shorter than in *ceratomioides*, hindtarsus very long, as long as cell of forewing. The discal lines of the forewing strongly dentate, the portions beyond SM^2 straight, parallel, more oblique than in *ceratomioides* ; outer margin strongly dentate. The mesial line of the abdomen rather strongly marked, the lateral ones vestigial, ending in rather large spots at the apices of the segments. The ventral

edges of the tergites with tufts of long scales, which are gradually dilated distally ; under surface of abdomen white.

♂ and early stages not known.

Hab. Peru : Chuchuras.

Type in coll. Staudinger ; another specimen from the same place in the Tring Museum.

638. **Xylophanes rhodina** spec. nov. (Pl. II. f. 13, ♂).

♂. Body *above* olive-walnut-brown ; a line above eye pale, mesothoracic tegula with a thin pale lateral border and a walnut-brown mesial band ; abdomen with dispersed long pinkish grey scales, a triple dorsal line, the mesial one darker brown, accentuated at the bases of the segments ; *underside* pale buff, cinnamon-rufous at sides, abdomen near the stigmata with tufts of spatulate creamy scales ; spines of tergites uniseriate. (Middle legs wanting.)

Wings, *upperside*, greenish olive, hindwing somewhat greyish.——Forewing : stigma black, a dark cloud distally of it, basal area shaded with pinkish grey scales, the same scales between the discal lines near hinder margin ; first discal line heavy, straight up to SC^5, where it is vestigial, dilated at costal margin into a spot, line 2 dentate, 3 vestigial, also dentate, 4 more straight, accentuated by vein-dots, marked at costal margin by a spot, 5 from apex, vestigial, except at apex, lines 2 to 5 turned basad from SM^2 to inner margin, accentuated by a dash upon M^2, (SM^1), and SM^2, line 5 dilated into a patch at inner margin, 6 and 7 vestigial and parallel to distal margin.——Hindwing : a vestigial brown discal line in an ill-defined, not very distinct, pinkish band.

Underside ferruginous red, basal half of both wings brown, disto-marginal band greyish or buffish brown.——Forewing : three discal lines curving costad in front, the first continuous, the second indistinct, marked only in front, the third less oblique behind than the first, indicated by vein-dots, marginal band dentate between veins, projecting most between R^1 and R^3 ; costal edge ochreous distally ; hinder angle a little projecting.——Hindwing : marginal band dentate between veins, preceded by a row of vein-dots, discal line present or not ; abdominal fold buff.

♂. Tenth abdominal tergite narrow, apex rounded, feebly truncate-sinuate ; sternite evenly rounded at end. Process of harpe broader than ordinarily in this genus, obtuse, compressed, thin, twisted (Pl. LIII. f. 6). Penis-sheath with a fin-shaped, dentate, recurved process as in *falco*, and a short conical process pointing to the right side (Pl. LVII. f. 12).

♀ and early stages not known.

Hab. Chiriqui.

Two ♂♂ in the Tring Museum ; not seen in other collections.

639. **Xylophanes godmani.**

**Chærocampa godmani* Druce, *Ent. Mo. Mag.* xix. p. 16 (1882) (Chiriqui ;—Mus. Brit.) ; id., in *Biol. Centr. Amer., Lep. Het.* ii. t. 3. f. 2 (1883) ; id., *l.c. Suppl.* p. 306. n. 16 (x) (1896)

♀. External spur of midtibia much shorter than internal. Basal ciliae of antennal segments prolonged.——Forewing more strongly falcate than in ♂ of *rubrata*, distal margin dentate, lines mostly less distinct, discal line 1 nearer base posteriorly, curved ; hinder angle more strongly produced.——Hindwing obviously narrower, dentate, a pale subanal patch divided by a transverse line, continued very indistinctly to R^3.

Underside : margin of forewing buffish, a broad, submarginal, chocolate-brown band from apex to R^3, broadly joined to basi-discal area. Brown marginal band of hindwing also joined to basal area between R^1 and R^3.

♂ and early stages unknown.

Hab. Chiriqui.

One specimen known, in the British Museum.

640. Xylophanes falco.

**Chaerocampa falco* Walker, *List Lep. Ins. B. M.* viii. p. 132. n. 8 (1856) (Mexico :—Mus. Brit.) ; Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 151. n. 34 (1859) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 562. n. 51 (1877) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 12. n. 17. t. 1. f. 8 (1881) (Mexico ; Honduras).

Choerocampa falco, Morris, *Cat. Lep. N. Am.* p. 20 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 172. n. 3 (1862) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 275. n. 69 (1875) ; Druce, *l.c. Suppl.* p. 307 (1896) (Mexico ; Guatemala).

**Choerocampa fugax* Boisduval, *Consid. Lép. Guatemala* p. 70 (1870) (Honduras ; Mexico ;—coll Charles Oberthür) ; id., *Spec. Gén. Lép. Hét.* i. p. 274. n. 68 (1875).

Choerocampa mexicana Erschoff, *Trud. Russk.* x. p. 62. t. 1. f. 2 (1876) (Mexico).

Chaerocampa fugax, Butler, *l.c.* ix. p. 565. n. 69 (1877).

Chaerocampa falco (!), Möschler, *Stett. Ent. Zeit.* xli. p. 57 (1880) (= *fugax*).

Thevetra falco, Kirby, *Cat. Lep. Het.* i. p. 656. n. 77 (1892) (= *mexicana* = *fugax*).

♂♀. Antenna of ♀ without prolonged basal ciliae to the segments. External spur of midtibia shorter than internal. Abdomen with long pale hair-scales as in *ceratomioides*. Forewing with seven lines converging towards apex, besides distinct traces of two more antemedian lines proximally near hinder margin ; discal lines 1 to 4 curved behind, 4 almost following the curve of the hinder margin, 5 from apex, distinct to R^1, then vestigial and represented by more or less dispersed scales, which form a patch along hinder margin, lines 6 and 7 parallel with 5 and with outer margin. The pale wood-brown hindwing has two discal lines, the proximal one broad, the other thin, more or less joined to the first, the two forming a central band, which is followed by a third line indicated by vein-dots ; a distinct submarginal band is separated from the margin by a greyish wood-brown marginal band, the black band touching the edge of the wing only at SC^2 and SM^2.

♂. Tenth abdominal segment of the usual form ; the tergite truncate-sinuate. Process of harpe rather short, pointed, slightly curved. Penis-sheath with a rather long dentate process, which is produced distally towards the right side into another, short, dentate lobe.

Early stages not known.

In a ♀ from Guatemala in the British Museum the two antemedian lines of the forewing are longer and stand close to the discal ones ; the discal lines 1 to 4 are straight behind, not curved ; the patch of black scales at internal margin, near angle, is less distinct. The black discal band of the hindwing is broader and the ground-colour of the wing more pinkish.

Hab. Central America : Mexico to Guatemala and Honduras (extending doubtless farther south).

In the Tring Museum 2 ♂♂, 4 ♀♀ from Mexico, one labelled Tacubaya, August.

641. Xylophanes xylobotes.

Choerocampa xylobotes Burmeister, *Descr. Rép. Argent.* v. p. 355. n. 2 (1878) (Arica, Peru) ; id., *l.c. Atlas* p. 28. t. 10. f. 2 (1879).

Theretra xylobates (!), Kirby, *Cat. Lep. Het.* i. p. 658. n. 105 (1892) ; Bonningh., *Iris* xii. p. 128. n. 55 (1899) (Rio de Janeiro ; partim ?).
Chaerocampa ceratomioides, Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 12. n. 18 (1881) (partim).
Chaerocampa xylobates (!), id., *l.c. Suppl.* p. 307 (1896) (not distinct from *ceratomioides*).

♂ ♀. Paler than *ceratomioides*, the dorsal lines of the abdomen continuous as in *guianensis* ; the black apical line of the antenna very short.——Forewing : costal spots vestigial ; the most distal one of the subbasal lines running along M to base of R^3, discal and postdiscal lines decidedly straighter than in *ceratomioides*, not dentate between SC^5 and R^3, the fifth line nearly as heavy as in the allied species, but almost straight ; the feebly marked submarginal line straighter than in *ceratomioides*, not following the curve of the discal margin so obviously as in that species ; distal margin even, not undulate, without distinct internervular spots ; the pale discal space broader before inner margin than in *ceratomioides*, being posteriorly somewhat widened and rounded. On the underside the ochraceous tawny or buff narrow postdiscal zigzag space of the forewing of *ceratomioides* much broader in *xylobotes*.

♂. Tenth abdominal sternite somewhat shorter than in *ceratomioides* ; the harpe slenderer ; the process of the penis-sheath much longer and narrower.

Larva see Appendix.

Hab. Peru ; Argentina ; Southern Brazil.

In the Tring Museum 2 ♂♂, 4 ♀♀ from : Rio de Janeiro ; Leopoldina.

642. **Xylophanes media** spec. nov. (Pl. 11. f. 1, ♀).

♀. Close to *ceratomioides*. The dorsal lines of the abdomen converging basad on segments 2 to 5.

Wings, *upperside*.——Forewing : the spot at apical fourth of costa vestigial ; the discal and postdiscal lines curved and dentate as in *ceratomioides*, but the fourth line very distinct within the pale area R^3—M^2, the fifth line much less black, and vestigial to M^2 ; within the pale area there is an additional, feebly marked line between the fourth and fifth ; outer margin evenly coloured, more oblique and consequently longer than in *ceratomioides*, very faintly undulate ; the interspaces of the lines paler than in that species.——Hindwing : the pale discal and central areas shaded with brown, the band separating them narrower and more clearly defined than in the allied species.

Underside of wings more uniform in ground-colour, the ochraceous and buff postdiscal space of forewing and the disc of hindwing russet-cinnamon, the disc of the forewing without the reddish tint of the three allied species, the costal area as pale as in *ceratomioides*.——Forewing : five lines on disc, curving costad, the first reaching SC^{3+4}, the second stopping at SC^5, the three others, of which the middle one is faint, converge, and are continued as a single line from R^3 to SC^4, ending in a spot.——Hindwing : two parallel lines on disc, the proximal one crossing R^3 and M^1 close to cell, vestigial to costal margin, S-shaped, the second distinct only behind, then continued to costa by a series of nerve-dots.

♂ and early stages not known.

Hab. Venezuela ; Peru.

One ♀ from Aroa, Venezuela, in the Tring Museum, *type* ; another ♀ in the collection of Charles Oberthür, from Chanchamayo, Peru.

643. Xylophanes ceratomioides.

Pergesa anubus, Walker (*nom* Cramer, 1777), *List Lep. Ins. B. M.* viii. p. 151. n. 3 (1856) ; Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 75 (1868).

Choerocampa ceratomioides iid., *Ann. Lyc. N. Y.* viii. p. 358. t. 14. f. 2 (1867) (Mexico) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 264. n. 52 (1875) (Cayenne ; Brazil ; Colombia ; Guatemala ; Mexico) ; Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 307 (1896) (Mexico ; Guatemala ; Chiriqui).

Chaerocampa ceratomioides, Boisduval, *Consid. Lép. Guatemala* p. 70 (1870) (Honduras) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 567. n. 70 (1877) (Rio de Jan. ; Venezuela ; partim) ; Druce, *l.c.* i. p. 12. n. 18 (1881) (partim).

Choerocampa minos, Ménétries, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. *Suppl.* p. 93. n. 1546 (1856) (*nom. nud.* ! Cayenne) ; Boisd., *l.c.* p. 70 (1870).

Anceryx caprcolus Schaufuss, *Nunq. Otios.* p. 16 (1870) (Venezuela).

Theretra ceratomioides, Kirby, *Cat. Lep. Het.* i. p. 658. n. 104 (1892).

Theretra xylobates (!), Bönninghausen, *Iris* xii. p. 228. n. 55 (1899) (partim ?).

♂ ♀. In this species and its close allies the presence of some long, narrow, whitish scales gives the body a peculiar striated appearance. The pale discal band of the hindwing is quite variable in length and width, sometimes it reaches the costal margin and is connected with the anal patch, in other specimens it does not reach SC^2 ; the veins traversing it are occasionally all or nearly all black. External spur of midtibia shorter than internal ; antennal segments of ♀ with prolonged fasciculated ciliae.

♂. Tenth tergite gradually narrowed to middle, the sides almost parallel from middle to end, upper surface of the distal portion evenly convex, under surface concave, apex slightly curved downwards, with a faint vestige of a sinus ; sternite twice as broad as apical part of tergite, obtusely rounded, upper surface almost flat, transversely rugate. Harpe narrow, twisted, slightly spatulate, irregularly dentate. Apical margin of penis-sheath produced at the right-hand side into a very short tooth, denticulate or simple, at the left side into a longer, broader, dentate process (Pl. LVII. f. 13).

W. Schaus gave us the following description of the larva : " 75 mm. long, not very stout, and tapering towards the head, which is very small and brown. Body rich brown dorsally, paler laterally. A subdorsal black streak, and on fourth segment a small round pale brown spot representing an ocellus. Caudal horn long, pointed, thick, slightly rough, brown. Laterally the pale brown is mottled with a darker shade."

Hab. Neotropical Region, excl. of Antilles, from Mexico to Southern Brazil.

In the Tring Museum 40-odd specimens from : Vera Cruz, Mexico ; Honduras; Costa Rica ; Bogota, Colombia ; Chimbo, Ecuador, 1000 ft., viii. '97 (Rosenberg); S. Domingo, Carabaya, S.E. Peru (Ockenden) ; Rio Cachyaco, Peru (Stuart) ; Aroa, Venezuela ; Nova Friburgo, Rio de Janeiro.

644. Xylophanes guianensis.

Theretra guianensis Rothschild, Nov. Zool. i. p. 77 (1894) (British Guiana ;—Mus. Tring).

♂ ♀. Basal ciliae of antennal segments of ♀ longer than in the allied species. External spur of midtibia shorter than internal. Dorsal lines of abdomen parallel as in *xylobotes*.

Wings, *upperside*.——Forewing : pale antemedian area almost narrowed to a point before internal margin, discal lines 2 to 4 not dentate, except at M^2 and (SM^1), less curved before M^2 than in *ceratomioides*, distinct within pale area, this not

so sharply defined, deeper in colour, with a straight pale band, margin much more strongly scalloped than in *ceratomioides*.——Hindwing: pale discal band narrower than the black band separating it from the subcentral patch.

Underside: pale postdiscal band of forewing as narrow as in *ceratomioides*, but straight.

♂. Both the tergite and sternite of the tenth abdominal segment longer and narrower than in *ceratomioides*; the harpe more compressed and somewhat stronger dentate; left process of penis-sheath broader than in the allied species.

Early stages not known.

Hab. South America: British Guiana; Ecuador.

In the Tring Museum 1 ♂, 2 ♀♀ from: Rio Demerara; Paramba, Ecuador.

645. **Xylophanes anubus.**

Sphinx anubus Cramer, *Pap. Exot.* ii. p. 46. t. 128. f. c (1777) (Surinam); Goeze, *Ent. Beytr.* iii. 2. p. 221. n. 61 (1780); Fabr., *Spec. Ins.* ii. p. 152. n. 55 (1781); id., *Mant. Ins.* ii. p. 98. n. 60 (1787); Gmel., *Syst. Nat.* i. 5. 2384. n. 88 (1790); Fabr., *Ent. Syst.* iii. 1. p. 376. n. 62 (1793).

Xylophanes anubus, Hübner, *Verz. bek. Schm.* p. 136. n. 1456 (1822).

Chaerocampa anubus, Walker, *List Lep. Ins. B. M.* viii. p. 134. n. 13 (1856); Butl., *Trans. Zool Soc. Lond.* ix. p. 562. n. 50 (1877) (Rio de Jan.); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 10. n. 6 (1881) (Nicaragua).

Chaerocampa nitidula Clemens, *Journ. Ac. N. Sc. Philad.* iv. p. 151. n. 37 (1859) (Mexico); Butl., *l.c.* p. 564. n. 58 (1877) (Mexico); Druce, *l.c.* i. p. 11. n. 12 (1881) (Mexico; Guatemala; Nicaragua; Chiriqui; Ecuador).

Choerocampa nitidula, Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 173. n. 6 (1862); Druce, *l.c. Suppl.* p. 305 (1896) (Mexico; Guatemala; Costa Rica).

Choerocampa laevis Grote & Robinson, *Ann. Lyc. N. York* viii. p. 356. t. 14. f. 1 (♀) (1867) (Mirador, Mexico); Boisd., *Spec. Gén. Lép. Hét.* i. p. 265. n. 53 (1875) (Mexico).

Choerocampa miradoris id., *l.c.* sub n. 53 (1875).

**Choerocampa alcides* id., *l.c.* p. 266. n. 54 (1875) (Cayenne).

Choerocampa anubus id., *l.c.* p. 266. n. 55 (1875) (Cayenne); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 350 (1876) (Surinam).

Chaerocampa alcides, Butler, *l.c.* p. 631 (1877) (= *anubus*).

Theretra anubus, Kirby, *Cat. Lep. Het.* i. p. 652. n. 23 (1892).

Theretra alcides, id., *l.c.* n. 24 (1892); Bönningh., *Iris* xii. p. 128. n. 54 (1899) (Rio de Jan.).

Theretra nitidula, Kirby, *l.c.* p. 658. n. 94 (1892).

Theretra nitidula var. a. *Choer. laecis*, id., *l.c.* sub n. 94 (1892).

♂♀. The large material of this species which we have examined exhibited considerable variation. The more extreme individuals have been described as distinct species, and we admit that the differences are so obvious that one might easily be induced to consider them of specific value. But the numerous specimens which connect the extremes with one another show this conclusion to be invalid.

As in *ceratomioides* the external spur of the midtibia is somewhat shorter than the internal one. Fresh specimens have a greenish tint. Abdomen with three dorsal lines of which the middle one is more distinct, or with a mesial line accompanied by two series of dots, or with only these series of dots; the type of *alcides* has lines. Spines of posterior tergites uniseriate.

Wings, *above*.——Forewing: with or without a dark cloud on disc beyond cell 7 oblique lines of which the third is the heaviest, the lines posteriorly sometimes more, sometimes less, oblique, the three proximal ones often vestigial or indicated by dots on the veins, the three external ones also feeble or even absent, the most distal one, however, at least indicated by more or less heavy nerve-dots; the fourth line the heaviest, reaching hinder margin in middle or at apical third.——Hindwing: the black colour variable in extent, the pale discal patch being often

much reduced : Cramer's figure is certainly exaggerated ; the pale spots R^1—R^3 generally confluent, very rarely separated.

South American ♀♀ on the whole more distinctly striped than the ♂♂, and than Mexican individuals of both sexes.

Length of forewing : 32 to 58 mm.

♂. Tenth abdominal segment slenderer than in *ceratomioides*, the tergite rounded at end, feebly spoon-shaped, concave below ; the sternite concave above, very feebly sinuate in dorsal view. Process of harpe curved upwards, basally cylindrical or prismatical, distally irregularly compressed, its sharp upper edge notched and denticulate. Penis-sheath (Pl. LVII. f. 14) peculiar : a patch of teeth at the left side, not distinctly raised or separated from the rest of the sheath as a process : a short dentate right-sided process directed proximad.

Early stages not known.

Hab. Neotropical Region, from Mexico to Southern Brazil.

In the Tring Museum 24 ♂♂, 22 ♀♀ from : Vera Cruz, Mexico ; Honduras ; Costa Rica ; Popayan, Colombia (Lehmann) ; Paramba and Lita, Ecuador ; Onaca, Santa Marta (Engelke) ; Aroa and Puerto Cabello, Venezuela ; Rio Demerara ; Rio de Janeiro ; Sao Paulo.

646. Xylophanes docilis.

**Chaerocampa docilis* Butler, *Proc. Zool. Soc. Lond.* p. 9 (1875) (Ecuador :—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 564. n. 62. t. 94. f. 1 (1877).

Chaerocampa docilis, Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 305. n. 13 (A) (1896) (sub syn.).

Theretra docilis, Kirby, *Cat. Lep. Het.* i. p. 658. n. 96 (1892).

♂. Perhaps only a form of *amadis*, from which it differs in the following particulars : abdomen with distinct mesial line, outer margin of forewing more straight, discal line also straighter, a vestigial, dentate, pale submarginal line proximally of the submarginal dots ; the brown marginal border of the forewing below narrower, the black postdiscal dots upon the veins rather more distal. Midtibial spurs equal in length.

Sexual armature as in *amadis amadis*.

♀ and early stages not known.

Hab. Ecuador ; Bolivia.

In the Tring Museum 2 ♂♂ from : R. Songo to R. Suapi, Bolivia, 1100 mm., March, April 1896 (Garlepp) : S. Domingo, Carabaya, S.E. Peru, 6000 ft., June 1902, dry season (Ockenden).

647. Xylophanes amadis.

Sphinx amadis Stoll, in Cram., *Pap. Exot.* iv. p. 216. t. 394. f. c (1782) (Surinam).

Orens amadis, Hübner, *Verz. bek. Schm.* p. 136. n. 1464 (1822).

Chaerocampa amadis, Walker, *List Lep. Ins. B. M.* viii. p. 134. n. 11 (1856) ; Butl., *Trans. Zool. Soc. Lond.* p. 564. n. 63 (1877).

♂♀. Ground-colour varying from green to brown-red. A single prominent line on the forewing, ending at the apex, olive-green or olive, gradually shading off distally, sharply defined by a pale border proximally, which border is generally more prominent near internal margin ; proximally of the pale border there are vestiges of two or three lines curving costad in front, mostly indicated by dots on the veins ; a submarginal line of dots is also present in most examples ; a dark

postcostal cloud beyond cell ; two feebly marked antemedian lines, curving costad. ——Hindwing : a single broad pale band, greenish, often with a reddish tint, entire or interrupted ; distal margin also pale. Abdomen blackish olive-green dorsolaterally at the base ; this colour more or less occupying also the tergites of the first two segments, two rows of dots on back. Spines of abdomen very strong, single on last segments and long in this and several of the following species (the same in *docilis*).

♂. Sexual armature much like that of *anubus*, slightly variable geographically; left side-patch of teeth of penis-sheath with fewer teeth than in *anubus*.

Early stages not known.

Hab. Neotropical Region, excl. of Antilles.

Four subspecies.

Stoll's figure is doubtless meant for the Venezuela-Surinam form of this species. Clemens's description of *thalassina* applies also to the present insect, though it is quite impossible to say with certainty to which special subspecies the description refers ; under these circumstances we can do nothing with the name but treat it as a synonym of *amadis*. Though we have kept *docilis* separate from *amadis*, we are not sure that it is a distinct species. On the other hand, further researches and more material from different localities may prove that *amadis*, *stuarti*, and *cyrene* are not only specifically distinct from *docilis* and *epaphus*, but also from one another.

a. X. amadis amadis (Pl. IX. f. 15, ♂).

Sphinx amadis Stoll, *l.c.*

Chaerocampa amadis, Walker, *l.c.*

Choerocampa amadis, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 273. n. 66 (1875) (Cayenne) ; Möschl.; *Verh. Zool. Bot. Ges. Wien* xxvi. p. 350 (1876) (Surinam).

(?) *Chaerocampa thalassina* Clemens, *Journ. Ac. N. Sc. Philad.* iv. p. 150. n. 33 (1859) (hab. ?) Butl., *l.c.* ix. p. 564. n. 6 (1877).

(?) *Choerocampa thalassina*, Morris, *Cat. Lep. N. Am.* p. 20 (1860).

(?) *Theretra thalassina*, Kirby, *Cat. Lep. Het.* i. p. 658. n. 103 (1892).

♂ ♀. Inner midtibial spur reduced, as long as or shorter than outer spur. Pale band of hindwing more or less interrupted, the black colour extending along veins R^3 to M^2.

♂. Tenth tergite rounded-truncate at tip : apex of sternite very obtusely pointed.

Hab. Surinam ; Venezuela.

In the Tring Museum 13 ♂♂, 7 ♀♀ from Merida, Venezuela (Briceno).

b. X. amadis cyrene.

**Chaerocampa cyrene* Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 11. n. 13. t. 1. f. 5 (♀) (1881) (Chiriqui ;—coll. Druce).

Theretra drucei Kirby, *Cat. Lep. Het.* i. p. 658. n. 95 (1892) (nom. nov. loco *cyrene*).

Theretra epaphus, Schaus (*non* Boisduval, 1875), *Ent. News* ix. p. 134 (1898) (= *cyrene* = *drucei*).

Choerocampa drucei, Druce, *l.c. Suppl.* p. 305. n. 13 (1896).

Choerocampa docilis, id. (*non* Butler, 1875), *l.c. Suppl.* p. 305. n. 13 (A) (1896) (Mexico ; Honduras ; Chiriqui ; = *staudingeri* = *stuarti*).

**Theretra staudingeri* Rothschild, Nov. Zool. i. p. 76 (1894) (Chiriqui) ; id., *l.c.* iii. p. 600. n. 3. t. 13. f. 10 (♂) (1896).

♂ ♀. Inner spur of midtibia longer than outer one. Basal segments of abdomen dorsally less extended green or brown than in the preceding race. Submarginal

dots of forewing above generally much less distinct. Pale band of hindwing duller in colour, less sharply defined, not incised or interrupted at veins R^3, M^1, or M^2, mostly with a slight reddish tint. Black basi-discal area of forewing below more restricted.

X. cyrene is based on a reddish ♀, *staudingeri* on a green ♀.

♂. Tenth abdominal tergite truncate-sinuate; sternite more acute than in *amadis amadis*.

Hab. Central America: Mexico to Colombia.

In the Tring Museum 8 ♂♂, 4 ♀♀ from: Chiriqui; Jalapa, Orizaba and Teocelo, Vera Cruz, Mexico, ii. iv. vii. ix.

A ♂ nearly as red as the type of *cyrene* in coll. Charles Oberthür from Cundinamarca, Cauanche, Colombia (M. de Mathan).

c. X. amadis stuarti.

**Theretra stuarti* Rothschild, Nov. Zool. i. p. 665 (1894) (Peru;—Mus. Tring); id., *l.c.* ii. t. 9. f. 10 (♀) (1895).

♀. The pale line of forewing from base to apex white, broad; pale band of hindwing as in *cyrene*, rather nearer the margin; under surface less reddish than in the green specimens of *cyrene*. (Mid- and hindlegs wanting.)

Hab. Rio Cachyaco, affl. of Rio Huallaga, Peru.

One ♀ in the Tring Museum, collected by C. Maxwell Stuart.

d. X. amadis goeldi subsp. nov.

♀. Similar to *stuarti*; lateral stripe of mesothoracic tegula white; discal line of forewing broader, almost pure white, widening apically, strongly contrasting with the olivaceous green ground-colour; pale band of hindwing dull green, becoming gradually faint and narrower costad, interrupted at the veins, consisting of triangular spots, of which the last is by far the largest, portion M^1—C of the band vestigial; brown irroration of underside denser than in *stuarti*. Miditibial spurs equal in length.

Hab. Para, at the electric light, May (Dr. Goeldi).

1 ♀ in the Bern Museum.

648. Xylophanes epaphus (Pl. VI. f. 1, ♀).

**Chaerocampa epaphus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 267. n. 56 (1875) (Cayenne;—coll. Charles Oberthür).

Chaerocampa epaphus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 631 (1877).

Theretra epaphus, Kirby, *Cat. Lep. Het.* i. p. 652. n. 26 (1892); Schaus, *Ent. News* ix. p. 134 (1898) (= *cyrene* ex err.).

**Theretra böttgeri* Rothschild, *Iris* vii. p. 298. n. 5 (1894) (Chuchuras, Peru; Sao Paulo;—coll. Staudinger).

♂♀. A reddish species, resembling in colour the type of *X. amadis cyrene*. The two antemedian lines of the forewing much wider apart than in *cyrene*, the proximal one midway between base and distal one at M^2; discal line obviously more proximal than in the forms of *amadis*, being at R^3 midway between cell and outer margin and at SC^5 midway between base of this vein (fork) and outer margin; postcostal patch beyond apex of cell transverse, smaller than in *amadis*. Thorax with broad pale median stripe which is rubbed away in the specimen figured.

♂. Harpe similar to that of *mexicana*. Penis-sheath nearly as in *amabus*, but right process broader, patch of teeth smaller and less densely denticulated.

Early stages not known.

Hab. South America: French and British Guiana; Peru; Sao Paulo.

In the Tring Museum 1 ♀ from Christianburg, R. Demerara.

In coll. Oberthür *type* (♂) from Cayenne.

In coll. Staudinger 1 ♂ from Sao Paulo; 1 ♂ (type of *böttgeri*) and 1 ♀ from Chuchuras, Peru.

649. Xylophanes belti.

**Chaerocampa belti* Druce, *Ent. Mo. Mag.* xiv. p. 248 (1878) (Chontales, Nicaragua;—Mus. Brit.); id., in *Biol. Cent. Amer., Lep. Het.* i. p. 11. n. 11. t. 1. f. 3. 4 (1881).
Theretra belti, Kirby, *Cat. Lep. Het.* i. p. 657. n. 91 (1892).
Chaerocampa belti Druce, *l.c. Suppl.* p. 305 (1896) (Orizaba, Chiriqui).

♂ ♀. One of the finest species. External spur of midtibia little shorter than internal. A stripe from base of forewing to palpus, a lateral patch on abdomen and underside of body and wings vinaceous brick-red. Abdomen with traces of two rows of dorsal dots. Upperside of wings olive-green, interspaces with a silky grey gloss; three antemedian lines, 2 and 3 merged together; discal lines not distinct, 3 and 4 separated by a straight, conspicuous, silky interspace. Band of hindwing either pale green or pinkish. Underside somewhat variable.

♂. Tenth abdominal tergite as in the allied species. Process of harpe suddenly curved upwards at end, compressed, the acute upper edge notched and dentate. Penis-sheath similar to that of *anubus*, the dentate right process broader than in *anubus*, and the patch of teeth on the left side not quite so prominent, the proximal teeth more regularly arranged in a row.

Early stages not known.

Hab. Central America: Mexico to Chiriqui.

In the Tring Museum 1 ♂ without locality.

650. Xylophanes rothschildi.

**Theretra rothschildi* Dognin, *Ann. Soc. Ent. Belg.* p. 107 (1895) (Loja;—coll. Dognin).

♀. *Upperside* of forewing quite green, with one line (line 4), which ends at apex of wing. Hindwing rosy for the greater part, respectively shaded with rose-colour. Underside of body greenish clay-colour, sides reddish tawny like wings.

Hab. Loja, Ecuador.

One specimen in coll. Paul Dognin.

651. Xylophanes chiron.

Drury, *Illustr. Ex. Ins.* i. p. 56. t. 26. f. 3 (1771) (Jamaica).
Sphinx chiron id., *l.c. Index* (1773).
Sphinx sagittata Goeze, *Ent. Beytr.* iii. 1. p. 216. n. 42 (1780) (Jamaica).
Sphinx batus Fabricius, *Mant. Ins.* ii. p. 98. n. 62 (1787) ("India"!); Gmel., *Syst. Nat.* i. 5. p. 2385. n. 90 (1790).
Sphinx batus (!) Fabricius, *Ent. Syst.* iii. 1. p. 377. n. 94 (1793).
Chaerocampa chiron, Walker, *List Lep. Ins. B. M.* viii. p. 132. n. 7 (1856) (= *urchus*).

♂ ♀. Antenna of ♀ feebly compressed, basal ciliae of segments not distinctly prolonged. External spur of midtibia longer than internal, or of the same length. External row of spines of first protarsal segment regular, single, only here and there with an additional spine. Tomb of midtarsus strongly developed.

The colour of the upper surface varies from parrot-green to tawny-russet. The russet specimens are much rarer on the Continent than in Jamaica. The green colour often changes to russet when the insect becomes damp in the relaxing box. The discal lines of the forewing are not very distinct; four are marked in middle of hinder margin; the line from apex is short, but reappears generally beyond R^2. The hindwing has, besides the anal patch and a larger square spot M^2—SM^2, four or five ovate spots; spot SC^2—R^1 is always small, the next is generally the largest of the five, but is occasionally reduced to a streak. The abdomen is marked on the upperside by an extremely faint mesial line, which is seldom plainly visible, and by two rows of dots. Spines of tergites of abdomen very strong, uniseriate on last segments.

♂. The sexual armature remarkably different from that of all the other *Xylophanes*. Tenth abdominal tergite broad, flat, deeply sinuate, the sinus rounded, the lobes feebly curved downwards, slightly concave beneath, apex rounded (Pl. XLV. f. 9. 10); sternite (Pl. XLV. f. 11) compressed basally, dilated at end, truncate-sinuate, the angles rounded, the upper side concave. Harpe (Pl. LII. f. 4) rather widened dorsad, the upper margin angulate, the process compressed, feebly curved, apex rounded, mostly armed with a tooth, upper margin more or less notched. Penis-sheath (Pl. LVII. f. 18. 19): dorsal margin abruptly ending at the right side in a comb of from three to seven teeth; a regular row of long, sharply pointed teeth parallel to the edge, extending from near the comb to the left side—these teeth break off very easily except the two small proximal ones, so that one does not find many caught specimens which show the armature intact.

♀. Eighth abdominal tergite rather deeply sinuate. Vaginal armature more strongly chitinised than is ordinarily the case in this genus: the proximal edge of the mouth of the vagina more prominent.

Early stages not known.

Hab. Neotropical Region, inclusive of the West Indies.

Two subspecies:

a. X. chiromechus.

Sphinx nechus Cramer, *Pap. Exot.* ii. p. 125. t. 178. f. B (1777) (W. Indies); Goeze, *Ent. Beytr.* iii. 2. p. 224. n. 76 (1780); Fabr., *Spec. Ins.* ii. p. 152. n. 56 (1781); id., *Mant. Ins.* ii. p. 98. n. 61 (1787); Gmel., *Syst. Nat.* i. 5. p. 2384. n. 89 (1790); Fabr., *Ent. Syst.* iii. 1. p. 377. n. 63 (1793); Lep. & Serv., *Enc. Méth.* x. p. 466. t. 67. f. 1 (1825).

Theretra nechus, Hübner, *Verz. bek. Schm.* p. 135. n. 1447 (1822); Kirby, *Cat. Lep. Het.* i. p. 658. n. 101 (1892); Bönningh., *Iris* xii. p. 127. n. 52 (1899) (Rio de Janeiro).

Chaerocampa chiron, Walker, *l.c.* (1856); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 150. n. 32 (1859); Butl., *Trans. Zool. Soc. Lond.* ix. p. 565. n. 67 (1877) (Brazil; Montevideo); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 12. n. 15 (1881).

Chaerocampa chiron, Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 172. n. 2 (1862); Grote, *Trans. Amer. Ent. Soc.* iii. p. 184 (1871); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 350 (1876) (Surinam).

Chaerocampa nechus, Lucas, in Sagra, *Hist. Cuba* vii. p. 294 (1856); Grote, *Proc. Ent. Soc. Philad.* vi. p. 328 (1867) (Cuba); Boisd., *Spec. Gén. Lép. Hét.* i. p. 271. n. 62 (1875); Druce, *l.c. Suppl.* p. 306 (1896) (Mexico; Guatemala; Costa Rica; Chiriqui).

Chaerocampa nechus, Herrich-Sch., *Corresp. Bl.* p. 58 (1865); Grote, *l.c.* v. p. 50 (1865) (Cuba), id. & Rob., *ibid.* v. p. 155. n. 39 (1865); Butl., *Trans. Zool. Soc. Lond.* ix. p. 565. n. 68 (1877); Dew., *Mitth. Münch. Ent. Ver.* i. p. 91 (1877) (Porto Rico); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 12. n. 16 (1881); Gundl., *Contr. Ent. Cubana* p. 194 (1881).

Chaerocampa chiron a. *nechus*, Grote, *Trans. Amer. Ent. Soc.* iii. p. 184 (1871).

**Chaerocampa haitensis* Butler, *Proc. Zool. Soc. Lond.* p. 9. n. 18 (1875) (Haiti;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 565. n. 66 (1877).

Theretra haitensis, Kirby, *l.c.* n. 102 (1892).

We doubt that Cramer's figure was taken from a West Indian specimen, unless the owner of the type included Surinam in the West Indies (see p. 525). Body and forewing, above, green, very seldom tawny.

♂ ♀. Forewing with a clay-coloured patch at costal margin near apex and another larger one posteriorly on disc.

Hab. Central and South America, from Mexico to Urugnay ; Bahamas ; Cuba ; Haiti ; ? Porto Rico.

In the Tring Museum 80-odd specimens from : Haiti ; Cuba ; Nassau, Bahamas (Sir G. Carter) ; Florida ; various places in Central and South America.

b. N. chiron chiron.

Sphinx chiron Drury, *l.c.* (1773).
Sphinx sagittata Goeze, *l.c.* (1780).
Chaerocampa chiron, Walker, *l.c.* (1856) (sub syn.); Butl., *Proc. Zool. Soc. Lond.* p. 483, n. 51 (1878) (Jamaica) ; Maass., *Stett. Ent. Zeit.* xli. p. 57 (1880) (= *nechus* discoloured !).
Choerocampa chiron, Lucas, in Sagra, *Hist. Cuba* vii. p. 294 (1856) (Jamaica).
Choerocampa drurgi Boisduval, *l.c.* p. 267, n. 57 (1875) (Cuba *cf. loc.*).
Theretra chiron, Kirby, *l.c.* i. p. 658, n. 100 (1892).

♂ ♀. Differs from *nechus* constantly in the following points :—

Upperside : the discal lines of the forewing are less distinct, the clayish patches near apical and posterior angles of wing not or feebly marked.

Underside : body and wings more yellow, brown basal area of forewing more restricted and paler.

The green form apparently rarer than the tawny one.

Hab. Jamaica ; St. Lucia (and probably the other Lesser Antilles).

In the Tring Museum 9 ♂♂, 10 ♀♀ from Jamaica.

In the British Museum from St. Lucia.

652. Xylophanes crotonis.

**Chaerocampa crotonis* Walker, *List Lep. Ins. B. M.* viii. p. 133, n. 10 (1856) (Venezuela ;—Mus. Brit.).

♂ ♀. Antenna of ♂ variable in length and thickness, scaling in most specimens brown on anterior side of upper surface ; antenna of ♀ without prolonged seriated ciliae. Outer spur of midtibia longer than inner one ; spines of posterior abdominal tergites uniseriate, single, heavy, conical. Upperside of body and forewing varying from green to russet, underside from tawny to dirty ochre-yellow. Mesothoracic tegula with or without pale middle line. Discal line 4 of forewing above heavy, the three lines proximal of it sometimes vestigial only, line 5 ending at tip of wing, vestigial behind, 6 straight except in front, often accentuated by vein-dots, 7 indistinct. Distal margin of forewing below with an indication of a brown border as on hindwing, or this band absent, only the line corresponding to its inner edge being marked. Shape of wings not quite constant. Abdomen with yellowish white basal lateral patch extending on to metanotum, followed by a black patch, after which comes a distinct yellow stripe.

♂. Tenth tergite of abdomen truncate-sinuate (Pl. XLV. f. 12, 13, 14) Process of harpe (Pl. LII. f. 5) little curved, comparatively stout, notched or dentate above. Penis-sheath with a short marginal right process which is occasionally dentate, and a subapical dentate and somewhat fin-shaped left ridge or process.

Early stages not known.

There are two forms occurring in the same countries and being connected by intergradations :

a'. X. crotonis f. *crotonis.*

**Chaerocampa crotonis* Walker, *l.c.* (1856) (partim ;—Mus. Brit.) ; Boisd., *Consid. Lép. Guatemala* p. 70 (1870) (Nicaragua ; Colombia) ; Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 10. n. 8 (1881) (Chiriqui ; Nicaragua).
Chaerocampa crotonis, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 270. n. 61 (1875).
**Chaerocampa viridescens* Butler, *Proc. Zool. Soc. Lond.* p. 9. n. 16 (1875) (Bogota ;—Mus. Brit.) id., *Trans. Zool. Soc. Lond.* ix. p. 563. n. 57. t. 94. f. 2 (♀) (1877) ; Maass., *Stett. Ent.* Zeit. xli. p. 56 (1880) (= *crotonis*).
Chaerocampa aristor, Butler (*non* Boisduval, 1870), *l.c.* p. 563. n. 56 (1877) (Venezuela).
Theretra crotonis, Kirby, *Cat. Lep. Het.* i. p. 657. n. 81 (1892) (partim).
Theretra virescens, id., *l.c.* n. 90 (1892).

Walker describes under *crotonis* both the form with abdominal dorsal stripe and the form without it. As he calls the former "var. β" and "var. γ," Butler was certainly wrong in figuring it as typical *crotonis*. Maassen, *l.c.*, has already drawn attention to the mistake. Walker described four varieties, but had only three specimens (*a—c*), *l.c.*

♂ ♀. Dorsal stripes of abdomen absent or vestigial. Upperside of body and forewing varying from green to russet, especially bright green in some of the ♀♀ ; mesothoracic tegula occasionally with mesial line.

b'. X. crotonis f. *aristor.*

Chaerocampa crotonis Walker, *l.c.* var. β. var. γ. (1856) (Venezuela).
**Chaerocampa aristor* Boisduval, *Consid. Lép. Guatemala* p. 69 (1870) (Guatemala ;—coll. Charles Oberthür).
Chaerocampa hortulanus Schaufuss, *Nunq. Otios.* i. p. 18 (1870) (Venezuela).
Chaerocampa aristor Boisduval, *Spec. Gén. Lép. Hét.* i. p. 270. n. 60 (1875).
Chaerocampa crotonis, Butler, *Trans. Zool. Soc. Lond.* ix. p. 563. n. 55 (1877) (Venezuela) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* i. p. 1. t. 15. f. 1 (1877) ; Maass., *Stett. Ent. Zeit.* xli. p. 56 (1880) (=*aristor* = *crotonis* var.).
Chaerocampa nechus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 565. n. 68 (1877) (sub syn.).
Chaerocampa aristor, Druce, *l.c.* i. p. 10. n. 9. t. 1. f. 7 (1881) (syn. partim).
Theretra crotonis, Kirby, *Cat. Lep. Het.* i. p. 657. n. 84 (1892) (partim).
Theretra aristor, id., *l.c.* n. 89 (1892) (partim).
Theretra nechus, id., *l.c.* p. 658. n. 101 (1892) (partim).

♂ ♀. Thorax and abdomen with a broad and distinct grey mesial stripe, often more or less divided. A specimen in the Felder collection from "Venezuela, Moritz," is labelled *hortulanus* "von *chiron* Drury wesentlich verschieden." This is undoubtedly the true *hortulanus*.

Hab. Neotropical Region, known from Venezuela, Colombia, Panama, Costa Rica, and Guatemala.

In the Tring Museum :—

f. *crotonis*, 28 ♂♂, 6 ♀♀ from : Costa Rica ; Popayan, Colombia (Lehmann) : Santo Domingo, Carabaya, S.E. Peru, 6000 ft., iii.—vi., dry and wet seasons (Ockenden) ; Merida, Venezuela (Briceno).

f. *aristor*, 7 ♂♂ from : Popayan, Colombia (Lehmann) ; Merida, Venezuela (Briceno) ; Venezuela (Moritz).

653. **Xylophanes rhodochlora** spec. nov.

♂. Somewhat smaller than *crotonis*. Upperside of body and forewing bright olive-green ; thorax with grey mesial stripe shaded with olive-green like side-stripe of head and thorax ; yellow tuft of metanotum and of base of abdomen bright in

colour ; abdomen above as in *crotonis* f. *crotonis*, but side-stripe (from black patch backwards) narrower, shorter, paler, and speckled with olive and rufous ; underside of abdomen more pink than in *crotonis*, sides of breast more orange. *Midtibial spurs equal in length.*

Wings above as in green specimens of *crotonis*, but forewing decidedly shorter and broader, apex less produced ; first discal line distinct, rather heavy, second and third barely traceable, fourth heavy, rather broader than in *crotonis*, with a broad whitish green ill-defined proximal border, the following lines (5. 6. 7.) quite indistinct, the sixth slightly accentuated by vein-dots.

Underside of wings ferruginous red, distal border of *both* wings bistre-brown or brownish grey, strongly contrasting with the red disc.

♂. Harpe slenderer than in *crotonis*, strongly tapering apical, curved upwards. Penis-sheath as in *crotonis*, but the broad left dentate process with some larger teeth at the base.

Length of forewing : ♂, 40—43 mm.

Hab. Santo Domingo, Carabaya, S.E. Peru, 6000 ft., December to June, wet and dry seasons (Ockenden) ; R. Inambari, S.E. Peru, 6000 ft., Nov. (Ockenden).

In the Tring Museum 12 ♂♂ ; *type* : June.

This species was collected together with *crotonis* in some numbers at the same time and place. Easily recognised by the red underside of the wings.

654. Xylophanes eumedon.

**Choerocampa eumedon* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 272. n. 64 (1875) (Mexico ;—coll. Charles Oberthür) ; Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 305. n. 7 (A). t. 66. f. 9 (1896) (Mexico ; Guatemala).

Chaerocampa eumedon, Butler, *Trans. Zool. Soc. Lond.* ix. p. 631 (1877).

**Chaerocampa ortospana* Druce, *Ann. Mag. N. H.* (6). iv. p. 77 (1889) (Mexico ;—coll. Druce) ; Schaus, *Ent. News* vi. p. 141 (1895) (= *eumedon*).

Theretra ortospana, Kirby, *Cat. Lep. Het.* i. p. 657. n. 82 (1892).

Theretra eumedon, id., *l.c.* n. 85 (1892).

♂♀. External mesotibial spur longer than inner one. The pale mesial band of the abdomen is much narrower than in *crotonis* f. *aristor*, and divided by a sharply defined thin brown line. Mesothoracic tegula with a pale mesial line. The first discal line of the forewing very heavy, the second fused with it, except in front, interspaces between lines 1 and 3 very pale. Upper three spots of hindwing more or less fused together.

Not dissected.

Early stages not known.

Hab. Mexico, southward to Brazil.

In the Tring Museum 1 ♂ from Jalapa, Mexico, April 1897 (W. Schaus).

In the Paris Museum 1 ♂ from Guatemala, a ♀ from Brazil.

655. Xylophanes titana.

**Choerocampa titana* Druce, *Ent. Mo. Mag.* xiv. p. 219 (1878) (Chiriqui ;—coll. Druce).

Choerocampa aristor, Burmeister (*non* Boisduval, 1875), *Descr. Rép. Argent.* v. p. 355 (1878) ; id., *l.c. Atlas* p. 28. t. 10. f. 3 (♀), t. 15. f. 4. (*l.*). 8 (*p.*) (1889) (Petropolis).

Chaerocampa titana Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 11. n. 10. t. 1. f. 6 (1881) (Chiriqui).

Theretra aristor, Kirby, *Cat. Lep. Het.* i. p. 657. n. 89 (1892) (partim).

Theretra titana, id., *l.c.* n. 92 (1892).

♂♀. External spur of midtibia longer than inner one. Thorax and abdomen with two grey lines above, the interspace between which is about 2 mm. wide

in the middle of the abdomen, the lines merged together on pronotum. Mesothoracic tegula with a tawny mesial line. Forewing, above, nearly as in *eumedon*. Spots SC^2—M^2 of hindwing separate, but the upper ones generally close together; they are sometimes reduced in size and shaded over with black (in a ♀ from Sta. Catharina).

♂. Tenth abdominal segment strongly convex at end, not sinuate. Process of harpe sharply pointed, curved upwards, irregularly notched. The right process of the penis-sheath curved proximad, rather broad and dentate, the left ridge or process dentate, isolated, not being connected with the right process by a fold.

Larva and pupa figured by Burmeister, *l.c.* The larva with one ocellus, situated on the fourth segment; horn slender, curved.—Food-plant: ?

Hab. Neotropical Region: Mexico to Santa Catharina.

In the Tring Museum 16 ♂♂, 5 ♀♀ from: San José, Costa Rica, viii. (Underwood): Paramba, Ecuador; Aroa, Venezuela, iv.: Merida, x. (Briceno); Sta. Catharina.

656. **Xylophanes resta** spec. nov.

♂♀ Closely resembling large *tersa*, intermediate between this and *crotonis*. External spur of midtibia longer than inner one. Thorax with a grey mesial band which is continued on to the abdomen, being distinct on the two first segments and then becoming vestigial, divided by a faint brown mesial line and bordered by a similar line on each side; a clearly marked ochraceous ochreous lateral stripe on abdominal segments 3 to 6, the stripe much more distinct than in *tersa*, preceded by a conspicuous black patch, before which stands a patch of pale yellow hairs; abdominal sternites without distinct lines.

Wings, *upperside*.——Forewing: somewhat broader than in *tersa*, discal line 1 very heavy, disappearing in front, line 2 fused with it behind, there being only two distinct oblique lines in middle of hinder margin outside line 1: lines 3 and 4 close together, 4 thinner behind; 5 beginning at apex, the heaviest, especially heavy in front, ending in a cloud at hinder margin; the latter with whitish hairs near base and middle.——Hindwing: spots larger than in *tersa*, the upper ones closer to the margin, all separate, except spots M^2—SM^2, marginal spot at anal angle small.

Underside brighter in colour than in *tersa*, the brown markings therefore more prominent.——Forewing: a straight brown line parallel to outer margin, crossing R^3 only 1½ or 2 mm. from cell, often not distinct, marginal area not, or not much, darker than the disc, an ill-defined costal apical patch ochreous.——Hindwing: the brown marginal band divided by the ochreous or tawny veins.

♂. Tenth abdominal tergite sinuate, subcarinate above as in *tersa*; sternite broader than in *tersa*. Harpe (Pl. LII. f. 30) narrowed to a point, rather strongly curved upwards at end. Penis-sheath (Pl. LVII. f. 16) much more resembling that of *crotonis* than the sheath of *tersa*; a short right-sided marginal tooth, and a dentate, somewhat hand-shaped, left-sided process.

Length of forewing: 36—41 mm.

Early stages not known.

Hab. Neotropical Region: Venezuela; Peru; Tucuman.

In the Tring Museum 24 ♂♂, 2 ♀♀ from; Merida, Venezuela (Briceno), *type* ♂: Santo Domingo, Carabaya, S.E. Peru, iii.—vi., wet and dry seasons, 6000 ft (Ockenden); Tucuman.

657. Xylophanes tersa.

Drury, *Illustr. Ex. Ins.* i. p. 61. t. 28. f. 3 (1770) (Maryland; Jamaica; St. Christopher; Antigoa).
Sphinx tersa Linné, *Mant. Plant.* p. 538 (1771); Drury, *l.c. Index* (1773); Fabr., *Syst. Ent.* p. 537. n. 2 (1775); Müll., *Naturs. Suppl.* p. 302. n. 24 (1776); Goeze, *Ent. Beytr.* iii. 2. p. 203. n. 3 (1780); Fabr., *Spec. Ins.* ii. p. 153. n. 59 (1781); Stoll. in Cram., *Pap. Exot.* iv. p. 226. t. 397. f. c (1782); Fabr., *Mant. Ins.* ii. p. 98. n. 65 (1787); Gmel., *Syst. Nat.* i. 5. p. 2379. n. 7 (1790); Fabr., *Ent. Syst.* iii. 1. p. 378. n. 69 (1793); Abbot & Smith, *Ins. Georgia* i. p. 75. t. 38 (*l.*, *p.*, *i.*) (1797).
Theretra tersa, Hübner, *Verz. bek. Schm.* p. 135. n. 1449 (1822); Kirby, *Cat. Lep. Het.* i. p. 657. n. 81 (1892); Beutenm., *Bull. Amer. Mus. N. S.* vii. p. 287. t. 3. f. 4 (1895) (N. York); Bönningb., *Iris* xii. p. 128. n. 53 (1899) (Rio de Jan.).
Chocrorampa tersa, Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 303. n. 4 (1839); Lucas, in Sagra. *Hist. Cuba* vii. p. 293 (1856); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 171. n. 1 (1862); Grote, *Proc. Ent. Soc. Philad.* vi. p. 328 (1867); id., *Trans. Amer. Ent. Soc.* iii. p. 184 (1871); Grote, *Canad. Ent.* iii. p. 101 (1871) (Alabama); Boisd., *Spéc. Gén. Lép. Hét.* i. p. 268. n. 58 (1875); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 350 (1876) (Surinam); Burm., *Descr. Rép. Argent.* v. p. 354 (1878) (Buenos Ayres); id., *l.c. Atlas* p. 37. t. 15. f. 3 (*l.*) (1879) (Nova Friburgo; Buenos Ayres); Reed, *Rept. Ent. Soc. Ontario* xii. p. 57 (1882); Fern., *Sphing. N. Engl.* p. 62. n. 29 (1886); Grote, *Canad. Ent.* xviii. p. 132. n. 33 (1886); Smith, *Trans. Amer. Ent. Soc.* xv. p. 135. t. 6. f. 7 (genit.) (1888); Edw., *Bull. U. St. N. Mus.* xxxv. p. 42 (1889) (liter. rel. to metam.); Druce, in *Biol. Centr. Amer.*, *Lep. Het. Suppl.* p. 304 (1896); Rowl., *Ent. News* ix. p. 191 (1898) (Missouri, at light); Kaye, *Trans. Ent. Soc. Lond.* p. 138 (1901) (Trinidad).
Deilephila tersa, Drury, ed. Westwood, *Illustr. Ex. Ins.* i. p. 56. t. 28. f. 3. (1837); Grey, *Canad. Ent.* xi. p. 140 (1879) (N. York).
Philampelus tersa, Burmeister, *Sphing. Bras.* p. 60. n. 4 (1856) (larva descr.).
Metopsilus tersa, Duncan, in Jard., *Nat. Libr.* xxxvii. p. 99. t. 5. f. 1 (♀), t. 6. f. 1 (*l.*) (1843); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 22 (1874); id., *l.c.* ii. p. 226. n. 33 (1875); id., *l.c.* iii. p. 222. n. 35 (1877).
Chaerocampa tersa, Walker, *List Lep. Ins. B. M.* viii. p. 131. n. 5 (1856); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 150. n. 31 (1859); Herr.-Sch., *Corresp. Bl.* p. 58 (1865) (Cuba); Grote, *Proc. Ent. Soc. Philad.* v. p. 56 (1865) (Cuba); id. & Rob., *ibid.* v. p. 155. n. 43 (1865); Butl., *Trans. Zool. Soc. Lond.* ix. p. 563. n. 53 (1877) (*sagittata* excl.); Dew., *Mitth. Münch. Ent. Ver.* i. p. 91 (1877) (Porto Rico); Gundl., *Contr. Ent. Cubana* p. 191 (1881) (descr. of larva and pupa); Butl., *Papilio* i. p. 104 (1881) (Florida); Druce, in *Biol. Centr. Amer.* i. p. 10. n. 7 (1881); Pilate, *Papilio* ii. p. 66 (1882) (Dayton, Ontario); Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 196. t. 4. f. 35 (1882) (larva); Edw., *Ent. Amer.* iii. p. 163 (1887) (pupa).
Deilemera tersa Grote, *Hawk Moths N. Am.* p. 30 (1886).

♂♀. External spur of midtibia longer than inner one. Spines of abdominal tergites uniseriate. Abdomen with three faint lines above, the middle one very thin, a double line beneath, accompanied on each side by two more lines, which however are extremely faint; no black lateral patch. The spots of the hindwing variable in size, spot SC^2-R^1 often absent; this is the case in nearly every specimen from Jamaica and Cuba, but occurs also in individuals from other localities, while in individuals from St. Vincent the spots are more or less contiguous and stand closer to the margin. Barbados specimens in the British Museum are pale and have the spots of the hindwing large and non-confluent, while a ♀ from Guadeloupe has the upper spot shaded with tawny.

♂. Tenth abdominal tergite sinuate; sternite rather slender, pointed. Process of harpe of nearly even width to near end, dentate above. Armature of penis-sheath (Pl. LVII. f. 17) reminding one of that found in *anubus* and allies; the incrassate dorso-apical edge terminating dextro-laterally in a short dentate process, and continued on the left side into a low ridge, extending proximad and bearing a single row of teeth.

Larva with a row of seven round ocelli from fourth segment to horn, situated

generally in a pale stripe, the ocelli filled in with black or red according to figures. A specimen in the Tring Museum from Jamaica has the horn vestigial.—Food-plants : *Spermacoce*, *Manettia*.

Pupa almost grey ; stigmata in black spots.

Hab. Canada to Argentina, including the West Indies (not on the Bahamas ?) ; a common species.

In the Tring Museum 1 larva (Jamaica), 150-odd specimens from : Virginia ; N. Carolina ; Florida ; Cuba ; Jamaica ; Dominica ; Tobago : various places in Central and South America.

658. Xylophanes suana.

**Choerocampa suana* Druce, *Ann. Mag. N. H.* (6). iv. p. 77 (1889) (Bahamas ;—coll. Druce).
Darapsa suana, Kirby, *Cat. Lep. Het.* i. p. 671. n. 3 (1892).
Choerocampa evana (!), Hampson, *Ann. Mag. N. H.* (7). vii. p. 251 (1901) (Nassau ; Andros).

♂ ♀. Body and upperside of forewing more uniform in colour than in *tersa*, ash-colour ; abdomen not yellowish and tawny at the sides or below, spines of tergites much weaker. Forewing less elongate ; spots of hindwing reduced in size and number. Sexual armature the same as in *tersa*. One of our ♂♂ and another in the British Museum have the upperside of the thorax chestnut, the sides of the abdomen, the under surface of the body, and part of the wings reddish cinnamon-rufous, and the upperside of the forewing and the spots of the hindwing washed with the same colour.

Early stages not known.

Hab. Bahamas.

In the Tring Museum 2 ♂♂, 1 ♀ from Nassau, Bahamas (Sir G. Carter).

This is perhaps only a local race of *tersa*. Ordinary *tersa* occurs on Cuba, Florida, etc., and is apparently a wanderer in the Nearctic Region.

659. Xylophanes turbata.

Choerocampa turbata Edwards, *Ent. Amer.* iii. p. 89 (1887) (Vera Cruz) ; Beutenm., *Bull. Amer. Mus. N. H.* iv. p. 170 (1892) (three specim. ex coll. Hy. Edwards) ; Druce, in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 304. n. 3 (A). t. 66. f. 6 (1896) (Vera Cruz ; Belize, Brit. Honduras).
Theretra tubata, Kirby, *Cat. Lep. Het.* i. p. 656. n. 78 (1892).

♀. External spur of midtibia shorter than internal. Head and thorax with a dark olive shade along the white lateral stripe. Pattern of forewing distinctive : discal lines 1 and 2 forming together a prominent band which reaches to the tip of the wing ; lines 3 to 7 thin, 4 being barely more prominent than 3 and 6.

♂ and early stages not known to us.

Hab. Central America : Mexico ; British Honduras.

In the Tring Museum 1 ♀, ex coll. Hy. Edwards, received from the American Museum of Natural History.

660. Xylophanes elara.

**Choerocampa elara* Druce, *Ent. Mo. Mag.* xiv. p. 249 (1878) (Paraguay ;—coll. Druce).
**Choerocampa elicius* Möschler, *Verh. Z. B. Ges. Wien* xxxii. p. 332. t. 18. f. 47 (♀) (1882) (Surinam ;—coll. Staudinger).
Theretra elicius, Kirby, *Cat. Lep. Het.* i. p. 657. n. 93 (1892).
Darapsa elara, id., *l.c.* p. 671. n. 7 (1892).
**Theretra perviridis* Rothschild, Nov. Zool. i. p. 77. t. 5. f. 12 (♂) (1894) (Aroa, Venezuela ;—Mus. Tring).

♂. Scaling of antenna brown, creamy before hook. Wings and body yellowish olive-green above, olivaceous ochre-yellow beneath, underside of abdomen whitish grey. Thorax unicolorous ; abdomen with thin greenish olive mesial line.——Forewing : stigma black, discal lines straight, oblique, lines 1 to 3 feebly marked, 4 much heavier, 5 from tip, not distinct except in front, 6 scarcely traceable ; outer margin strongly concave below apex, then convex. Basal half of hindwing black. On underside there is a greyish black triangular patch behind cell, entering cell a little, a discal line corresponding to line 4 of upperside accentuated by a dot at costa, the apical line indistinct.——Hindwing with two discal lines, the first touching cell indistinct, the second a continuation of the line of forewing, not so strong.

♂. Tenth tergite truncate, distinctly sinuate ; sternite narrow, tapering to a point, distally narrower than tergite. Process of harpe rather stout, extreme end curved upwards, upper edge irregularly notched. Penis-sheath (Pl. LVII. f. 15) : a right-side process, dentate, directed proximad, a long row of teeth on the left side, the incrassate dorso-apical margin rounded.

Early stages not known.

Hab. Neotropical Region : Paraguay to Venezuela and Surinam.

In the Tring Museum 1 ♂ from Aroa, Venezuela.

In the Paris Museum 1 ♂, 1 ♀ from Brazil.

In coll. Druce from Paraguay (*type* of *elara*) ; in coll. Staudinger from Surinam (*type* of *elicius*).

661. **Xylophanes isaon** (Pl. VI. f. 11, ♂).

**Choerocampa isaon* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 272. n. 65 (1875) (Brazil ;—coll. Charles Oberthür).

Theretra isaon, Kirby, *Cat. Lep. Het.* i. p. 657. n. 86 (1892) ; Schaus, *Ent. News* ix. p. 135 (1898) (= *olivacea*).

**Theretra olivacea* Rothschild, Nov. Zool. i. p. 77 (1894) (Sao Paulo ;—Mus. Tring).

♂ ♀. Antenna of ♀ with rows of prolonged ciliae. Spurs of midtibia equal in length. Mesothoracic tegula with a tawny line in middle ; a grey mesial line on thorax, widening behind, continued on the abdomen by two widely separated and not very distinct bands, bordered dorsally each by a series of dots, which are often connected by an indistinct line ; a distinct brown mesial line on abdomen. Of the lines on the forewing the first and second are more or less merged together to a heavy band, line 3 thin and separated from 2 and 4 by pale interspaces ; line 4 very heavy, reaching the tip of the wing together with 5. Pale band of hindwing with a faint reddish tint, not sharply defined. The obviously diverging grey lines of the upperside of the body are a very distinctive character.

♂. Tenth abdominal tergite truncate-sinuate ; the sternite very slender, being narrower than the tergite, obtusely pointed. Process of harpe very slender, curved upwards, subcylindrical, apex compressed and more or less dentate. Dorsal edge of penis-sheath incrassate, forming an irregular horseshoe, of which the left arm is the longer ; each arm ending in a dentate ridge or lobe (Pl. LVII. f. 20).

Early stages not known.

Hab. Neotropical Region : Brazil.

In the Tring Museum 3 ♂♂, 6 ♀♀ from : Sao Paulo ; Leopoldina, Espirito Santo.

662. **Xylophanes hydrata** spec. nov. (Pl. VI. f. 2, ♀).

(?) *Theretra* spec. A, Bönninghausen, *Iris* xii. p. 129. n. 59 (1898) (Rio de Jan.).

♀. Body above and discal band of hindwing pale reddish ferruginous; forewing washed with the same colour. Palpus, breast, stigmatal region of abdomen and wings ochraceous ochre, underside of abdomen buff. Midtibial spurs of the same length. Last abdominal tergites with weak spines besides longer and stronger ones; spines uniseriate. Thorax without pale stripes; abdomen with a thin mesial line and at each side a broader but less distinct line somewhat deeper reddish. Antenna with seriated ciliae; scaling ferruginous in basal half, grey in distal half.

Wings, *above*.——Forewing: a black stigma; six lines in outer half, fourth the most prominent, sixth weak and broad, seventh accentuated by minute vein-dots; distal margin strongly convex, apex acute and produced.——Hindwing: basal half brownish black (costal area excepted), the black colour extending to apex of wing, where it meets a brownish black submarginal band, which does not quite reach to anal angle, being much shaded with ferruginous behind.

Wings *below* finely irrorated with cinnamon-rufous; markings extremely faint.——Forewing: brownish black from near base to beyond cell, except costal area; no distinct marginal band, but there are traces of four lines, the most proximal one 7 mm. from end of R^1, barely vestigial, the second a little more distinct between SC^5 and R^2, accentuated upon SC^5 and R^1 by tiny vein-dots, the third visible down to R^3, the fourth quite indistinct.——Hindwing: a slightly darker distal border, a vestigial line touching cell, followed by an equally weak second line, and then by a series of tiny vein-dots; cross-veins strongly oblique, D^1 little more than half the length of D^3.

Length of forewing: 38 mm.

Hab. Brazil.

A ♀ in the Oxford Museum.

Another ♀ in the Vienna Museum labelled: "Heyne, India? 1872," and bearing a second label with the name in pencil: "hydrata Plötz i. l." The species is easily distinguished by the absence of pale stripes from head and thorax, the shape and pattern of the forewing, etc. The Vienna specimen is partly discoloured, and redder than the type figured.

663. **Xylophanes robinsoni.**

Chaerocampa falco, Herrich-Sch. (*non* Walker, 1856), *Corresp. Bl.* p. 148 (1863); id., *l.c.* p. 58 (1865) (Cuba).

Chaerocampa robinsoni Grote, *Proc. Ent. Soc. Philad.* v. p. 54. t. 1. f. 2 (1865) (Cuba); id. & Rob., *ibid.* v. p. 155. n. 44 (1865); Butl., *Trans. Zool. Soc. Lond.* ix. p. 563. n. 52 (1877); Gundl., *Contr. Ent. Cubana* p. 193 (1881).

Chaerocampa robinsoni Grote, *l.c.* vi. p. 328 (1867); id., *Trans. Amer. Ent. Soc.* iii. p. 184 (1871); Boisd., *Spec. Gén. Lép. Hét.* i. p. 269. n. 59 (1875).

Chaerocampa curvatus Schaufuss, *Nunq. Otios.* p. 17 (1870) (Cuba).

Chaerocampa curvata, Butler, *Trans. Zool. Soc. Lond.* ix. p. 557. n. 17 (1877).

Theretra robinsoni, Kirby, *Cat. Lep. Het.* i. p. 656. n. 79 (1892) (= *curvatus*).

♂♀. Spurs of midtibia rather short, equal in length; long proximal spur of hindtibia reaching base of distal spurs. Mesothoracic tegula with a buffish middle line; sides of abdomen pale dorso-laterally, with some white scales, dorsal surface brown, sharply defined, narrowing behind, with an indistinct, thin, deeper

brown, mesial line.——Forewing, above, with eight lines, of which 1 to 3 form a heavy proximal band, twice gently curved, line 3 free in upper half or two-thirds, 4 very thin, 5 heavier, reaching together with 6 the tip of the wing, all the lines except 1 to 3 faint behind.

♂. Tenth abdominal segment similar to that of *isaon*, the tergite more compressed apically, the sternite more sharply pointed. Process of harpe straight, cylindrical, extreme end narrowed to a point, compressed, curved upwards. Penis-sheath (Pl. LVII. f. 21) without lobe and teeth dextro-laterally, with a row of teeth on the left side.

Early stages not known.

Hab. Cuba.

In the Tring Museum 2 ♂♂.

Also in coll. Staudinger and the Paris Museum.

664. Xylophanes damocrita.

**Choerocampa damocrita* Druce, *Ann. Mag. N. H.* (6). xiii. p. 168 (1894) (Jalapa ;—Mus. Brit.) ; id., in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 304. n. 2 (x). t. 66. f. 8 (1896).

♂♀. Antenna of ♀ with very faint indications of combs of ciliae. Spurs of midtibia nearly equal, the external one very little shorter than the internal. Thorax without grey middle line, mesothoracic tegula with tawny line. Abdomen with a lateral band on segments 3 or 4 to 7, tawny, streaked with ochreous scales. A blackish postcostal cloud near apex of cell, fourth line the heaviest, lines 1 to 3 abbreviated in front, less so behind, line 5 rather heavy, broken at R^3, interspace between 5 and 6 from R^3 to SM^2 somewhat ochraceous. Underside of wings reddish tawny, more or less shading into ochreous distally, brown marginal band sharply defined, prominent.

♂. Tenth tergite broader than in the preceding species, much less compressed apically, truncate-sinuate, angles rounded ; sternite also broader, obtusely rounded, middle of apical margin projecting a very little. Process of harpe curved upwards at end, compressed, slender. Dorso-apical margin of penis-sheath produced into a sharp dextro-lateral tooth ; on the left side there is a small ridge bearing a few teeth, the armature being similar to that of *germen* (Pl.. LVII. f. 7).

Early stages not known.

Hab. Mexico.

In the Tring Museum 4 ♂♂, 2 ♀♀ from Jalapa and Orizaba, Vera Cruz (W. Schaus).

665. Xylophanes maculator.

**Choerocampa maculator* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 274. n. 67 (1875) (Venezuela ;—coll. Charles Oberthür).

♂♀. Antenna of ♀ andromorphic. External spur of midtibia a little shorter than internal one. Colour of thorax and head characteristic : the dark brown dorsal border of the mesothoracic tegula continued over pronotum and head. Mesonotum and abdomen with a brown mesial line ; abdomen, besides, with a subdorsal line and a broad dorso-lateral band.——Forewing with a blackish patch near apex of cell ; line 4 heavy, ending with 5 at tip of wing ; there are sometimes four instead of three lines proximally of the main line ; line 5 interrupted, heavy, stopping at R^3 or a little beyond, and reappearing behind, internal margin shaded with black in distal half, especially between lines 4 and 6.

♂. Tenth tergite narrow, truncate-sinnate; sternite broader than tergite, rounded at end. Process of harpe rather stouter than in the preceding species, gradually narrowed, a little dilated before the acutely pointed end. Penis-sheath (Pl. LVII. f. 22): apical margin produced at the right side abruptly in a short, multidentate process; on the left side there is a slight elevated band of two rows of teeth.

Early stages not known.

Hab. Venezuela; Colombia; Ecuador.

Two subspecies:

a. X. maculator maculator.

**Choerocampa maculator* Boisduval, *l.c.*; Kirby, *Proc. Zool. Soc. Lond.* p. 269. n. 1 (1886) (Colombia; = *moeschleri*).

Choerocampa moeschleri Erschoff, *Trud. Russk.* x. p. 62. t. 1. f. 1 (1876) (Colombia).

Chaerocampa maculator, Butler, *Trans. Zool. Soc.* Lond. ix. p. 632 (1877).

Theretra maculator, Kirby, *Cat. Lep. Het.* i. p. 652. n. 25 (1892).

♂ ♀. Three distinct brown dorsal lines on abdomen within the pale dorsal area bordered laterally by the broad blackish stripes. Discal line 1 of forewing, above, not dentate upon veins R^1 and R^2. Band of hindwing reddish, indented proximally, veins R^3—M^2 being more or less obviously black.

Hab. Venezuela; Colombia.

In the Tring Museum 1 ♂, 1 ♀ from Venezuela.

b. X. maculator wolfi.

**Choerocampa wolfi* Druce, *Proc. Zool. Soc. Lond.* p. 778. t. 60. f. 1 (1882) (Ecuador;—coll. Druce).

Theretra wolfi, Kirby, *Cat. Lep. Het.* i. p. 658. n. 98 (1892) ("t. 9" ex err.).

♂. Dorsal lines of abdomen indistinct. Patch near apex of cell of forewing also indistinct; four discal lines proximally of the main line, line 1 dentate upon R^1 and R^2. Band of hindwing less reddish than in the preceding, broader, not indented.—Proximal series of teeth on the penis-sheath heavier than in *mac. maculator*, while the distal row is vestigial (in the specimen examined).

Hab. Ecuador and Peru.

In the Tring Museum 2 ♂♂ from Perené R., Peru, March 1900 (Simons).

666. **Xylophanes aglaor** (Pl. II. f. 8, ♀).

**Choerocampa aglaor* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 275. n. 70 (1875) (hab. ?;—coll. Charles Oberthür).

Chaerocampa aglaor, Butler, *Trans. Zool. Soc. Lond.* ix. p. 632 (1877).

Theretra aglaor, Kirby, *Cat. Lep. Het.* i. p. 657. n. 80 (1892); Schaus, *Ent. News* ix. p. 135 (1898) (= *libya* = *laelia* ex err.).

Theretra spec. A., Bönninghausen, *Iris* xii. p. 129. n. 59 (1898) (Rio de Jan.).

♂ ♀. Spurs of midtibia equal in length. Body *above* olive, sides of head and pronotum grey, middle of meso-metanotum and sides of abdomen shaded with long greyish hair-scales, dorsal edge of mesothoracic tegula dark olive, abdomen with a thin dark olive mesial line, base of abdomen a little darker dorso-laterally, this dark shade very indistinctly continued anad, below which shade there is a very faint pinkish ochraceous longitudinal band; scaling of antenna pale brown, greyish towards hook; under surface of body pinkish fawn-colour in middle, ochraceous at sides, abdomen with a longitudinal band across stigmata of ochraceous and creamy scales, legs wood-brown, striped with olive-green; spurs of midtibia of the same length; basal ciliae of antennal segments (♀) prolonged.

Wings, *upperside*.——Forewing : greyish olive, palest at end of cell and before apex, six lines close together, 1 to 5 turning costad between SC^1 and SC^5, 5 the most pronounced, but not essentially broader than the others, 6 running to tip of wing ; two more lines, 7 straight, accentuated upon the veins, 8 indicated by more or less dispersed scales ; between lines 6 and 7 there is posteriorly a vestige of an additional line ; internal margin as a rule blackish olive outside line 5 and 6.——Hindwing black ; a pinkish buff band, somewhat variable in width, not distinctly indented.

Underside clayish buff, more or less shaded with red-tawny.——Forewing : more than the basal half olive-cinnamon, a dark brown line about 4 mm. from cell at R^3, straight, oblique, curving costad before SC^5, followed by one or two less distinct lines, a third line parallel to the first indicated by vein-dots, ending at costal margin in a conspicuous, black, somewbat halfmoon-shaped spot ; marginal band pale isabella-colour or drab, paler towards edge of wing, with three vestigial lines, the proximal one forming the inner edge of the band abbreviated at R^3.——Hindwing : costal margin shaded with brown from base to discal lines ; four discal lines, the first two fused together to a rather broad one, which touches end of cell, the fourth indicated by vein-dots ; marginal band drab or isabella-colour ; extreme margin of wing more or less yellowish from apex to M^2.

♂. Not dissected.

Early stages not known.

Hab. Brazil.

In the Tring Museum 1 ♂, 3 ♀♀ from Leopoldina, Espirito Santo.

Type (♂) in coll. Charles Oberthür.

A ♀ in coll. W. Schaus from Tijuca, Prov. Rio de Janeiro.

667. **Xylophanes libya** (Pl. XIV. f. 5, ♀).

**Choerocampa neoptolemus*, Boisduval (*non* Stoll, 1782), *Spec. Gén. Lép. Hét.* i. p. 276. n. 71 (1875) (Cayenne).

**Choerocampa libya* Druce, *Ent. Mo. Mag.* xiv. p. 249 (1878) (Chiriqui ;—coll. Druce) ; id., in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 304 (1896) (Mexico ; Belize).

**Chaerocampa libya* Druce, *l.c.* i. p. 9. n. 2. t. 2. f. 5 (1881) (Nicaragua ; Chiriqui).

Theretra libya, Kirby, *Cat. Lep. Het.* i. p. 652. n. 21 (1892).

Theretra aglaor, Schaus (*non* Boisduval, 1875), *Ent. News* ix. p. 135 (1898) (= *laelia* = *libya* ex err.).

♂ ♀. Antenna of ♀ andromorphic. Spurs of midtibia variable : in ♀♀ they are sometimes of equal length, while in other ♀♀ and in the ♂♂ the external one is longer than the internal one.——Forewing with eight lines, the first four in pairs, line 5 heavier, mostly accentuated upon the veins by dots or dashes ; cell with a black dot opposite M^2 in most individuals ; a black subapical costal spot. Band of hindwing clayish pink-buff, of almost the same width throughout, concave proximally between R^2 and M^2, not reaching apex of wing or costal margin, sometimes stopping at R^3 ; the black outer border of the wing widest between R^1 and R^3, here as broad as the pinkish band, mostly distinctly dentate near R^2.

The *underside* more heavily marked with black and brown than in the two following species.——Forewing : the discal band emanating from the brown subdiscal area heavy, interrupted at the veins, mostly ending at SC^1, spot SC^1—SC^5 about 6 mm. from the conspicuous black subapical dot ; a brown line from apex to R^3 (or nearly to that vein), another to inner margin, interspace between the two lines pale drab, sometimes almost of the colour of the disc ; interspace between

second line and margin of the colour of the disc or a little paler ; fringe ochraceous and more or less brown.——Hindwing : two discal lines, the inner one the heavier, more or less separated into triangular or angle-shaped spots ; the brown marginal border also separated into spots from C to M^1, spot R^2—R^3 more projecting discad than the others, spot C—SC^2 small, sometimes vestigial.

♂. Tenth abdominal tergite truncate-sinuate. Process of harpe slender, curved at end, pointed. Penis-sheath (Pl. LVII. f. 23) with a short dentate process which projects proximad as in the allied species ; at the left side there is an oblique, slightly raised band of irregularly dispersed teeth.

Early stages not known.

Hab. Neotropical Region : Mexico to Peru and Surinam.

In the Tring Museum 8 ♂♂, 5 ♀♀ from : Vera Cruz, Mexico ; Chiriqui ; Rio Dagua, Colombia (Rosenberg).

In coll. Charles Oberthür from Balsapamba, Bolivar (M. de Mathan).

668. **Xylophanes loelia** (Pl. XIV. f. 6, ♀).

**Choerocampa loelia* Druce, *Ent. Mo. Mag.* xiv. p. 249 (1878) (Chiriqui ;—coll. Druce).
Choerocampa laelia id., *l.c.* i. p. 9. n. 3. t. 2. f. 4 (1881) (Mexico ; Chiriqui).
Choerocampa laelia (!) id., in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 304 (1896) (Costa Rica).
Theretra loelia, Kirby, *Cat. Lep. Het.* i. p. 652. n. 20 (1892) (Chiriqui).
Theretra aglaor, Schaus (*non* Boisduval, 1875), *Ent News* ix. p. 135 (1898).
(?) *Theretra neoptolemus*, Bönninghausen, *Iris* xii. p. 128. n. 56 (1899) (Rio de Jan.).

♂ ♀. Intermediate between *libya* and *neoptolemus*, agreeing better with the latter than with the former, except in the pale colour of the band of the hindwing.

Wings, *above*.——Forewing : no dot in cell, subapical costal dot seldom indicated.——Hindwing rather narrower and band more red than in *libya* ; the band much paler than in *neoptolemus*, reaching costal margin, its inner edge rather irregular and ill-defined, concave from R^2 to M^2 ; the black border of the wing much more even than in *libya*, broadest between R^2 and M^2, much narrower than the pink band, sharply defined, not dentate near R^2, stopping at C, where it is narrowed almost to a point.

Underside.——Forewing : the discal band emanating from the brown subdiscal area, which is not so dark as in *libya*, thin and not interrupted, more oblique than in *libya*, pointing towards the subapical costal dot, the line sometimes absent ; beyond it follow three or two faint continuous lines, occasionally absent ; the nerve-dots not quite so conspicuous as in *libya* ; the two lines from apex of wing closer together ; the angle formed between R^2 and R^3 much more obtuse than in *libya* ; outer margin less bright than disc ; fringe ochraceous.——Discal lines of hindwing straighter than in *libya*, not divided into spots, outer marginal border more even, continuous, less projecting discad between R^1 and R^3 ; no marginal spot before SC^2. External spur of midtibia apparently always longer than the internal one, but the difference is sometimes not conspicuous, especially in ♀♀.

♂. Process of penis-sheath (Pl. LVII. f. 24) obviously longer than in *libya*.

Early stages not known.

Hab. Neotropical Region : Mexico to the Amazons, perhaps farther south.

In the Tring Museum 20 ♂♂, 7 ♀♀ from : Rio Dagua, Colombia (Rosenberg) : Paramba, Ecuador ; Amazons (Bates) ; Venezuela ; British Guiana.

In the Bern Museum from Para (Dr. Goeldi).

669. Xylophanes neoptolemus.

Sphinx neoptolemus Stoll, in Cram., *Pap. Exot.* iv. p. 23. t. 301. f. F (1782) (Surinam).
Isoples neoptolemus, Hübner, *Verz. bek. Schm.* p. 136. n. 1464 (1822).
Chaerocampa neoptolemus, Walker, *List Lep. Ins. B. M.* viii. p. 134. n. 12 (1856); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p 350 (1876) (Surinam); Butler, *Trans. Zool. Soc. Lond.* ix. p. 556. n. 16 (1877).
**Chaerocampa trilineata* Walker, *l.c.* xxxi. p. 30 (1864) (Venezuela;—Mus. Brit.); Butl., *l.c.* n. 15 (1877); Maass., *Stett. Ent. Zeit.* xli. p. 56 (1880) (= *neoptolemus*); Druce, in *Biol. Centr. Amer., Lep. Het.* i. p. 9. n. 1 (1881) (Nicaragua; Venezuela; Trinidad); Schaus, *Ent. News* ix. p. 135 (1898) (= *trilineata*).
Theretra neoptolemus, Kirby, *Cat. Lep. Het.* i. p. 652. n. 18 (1892).
Theretra trilineata, id., *l.c.* n. 19 (1892).
Choerocampa trilineata, Druce, *l.c. Suppl.* p. 304 (1896) (Jalapa; Belize; Guatemala).
Choerocampa neoptolemus, Kaye, *Trans. Ent. Soc. Lond.* p. 138 (1901) (Trinidad).

♂♀. Stoll's figure is far from being exact. In fact, the breadth of the red band of the hindwing of the figure points to the preceding species instead of the present. However, as Stoll was more likely to be fairly correct in the colour than in the width of the band, we accept his name for the bright-red-banded species.

The three lines of the abdomen, above, are more distinct than in the two preceding species; meso-metanotum with grey mesial band. The poppy-red band of the hindwing varies little in colour; it is broader than in *libya* and *loelia*, reaching costal margin, or almost, tapering costad, its inner margin convex, more sharply defined than in *loelia*.

The *underside* of the wings more red than in the other species.——The discal line of the forewing distinct to near inner margin, a little less oblique than in *loelia*, more so than in *libya*, thin, continuous; black subapical costal dot mostly very small; submarginal lines forming a sharp angle before R^3 as in *libya*.—— Hindwing: discal lines continuous as in *loelia*, marginal band not interrupted, dentate between R^2 and R^3, no marginal spot C—SC^2.

♂. Sexual armature as in *loelia*.

Early stages not known.

Hab. Neotropical Region: Mexico to Surinam.

In the Tring Museum 19 ♂♂, 8 ♀♀ from: Vera Cruz, Mexico; Costa Rica; Chiriqui; Aroa, Venezuela; Rio Demerara.

670. Xylophanes thyelia.

Sphinx thyelia Linné, *Syst. Nat.* ed. x. p. 492. n. 22 (1758) ("India"); id., *Mus. Lud. Ulr.* p. 260 (1764); Clerck, *Icon. Ins.* ii. t. 46. f. 4 (1764); Houtt., *Naturl. Hist.* i. 11. p. 156. n. 22 (1767); Fabr., *Syst. Ent.* p. 547. n. 37 (1775) (India *err. loci*); id., *Spec. Ins.* ii. p. 153. n. 60 (1781); id., *Mant. Ins.* ii. p. 98. n. 67 (1787); id., *Ent. Syst.* iii. 1. p. 378. n. 70 (1793) (partim); Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 140. n. 178 (1882) (recensio crit.; not *theylia* of Cramer).
Sphinx theylia Linné, *Syst. Nat.* ed. xii. p. 803. n. 24 (1767); Müll., *Naturs.* v. 1. p. 642. n. 24 (1774); Goeze, *Ent. Beytr.* iii. 2. p. 176. n. 24 (1780) (partim); Gmel., *Syst. Nat.* i. 5. p. 2386. n. 24 (1790) (partim).
Chaerocampa eson, Walker, *List Lep. Ins. B. M.* viii. p. 137 n. 17 (1856) (sub syn.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 566. n. 13 (1877) (sub syn.).
**Chaerocampa salvini* Druce, *Ent. Mo. Mag.* xiv. p. 249 (1878) (Guatemala;—coll. Druce).
Chaerocampa salvini id., in *Biol. Centr. Amer., Lep. Het.* i. p. 9. n. 5. t. 1. f. 2 (1881) (Guatemala; Nicaragua; Chiriqui).
Theretra thyelia, Kirby, *Cat. Lep. Het.* i. p. 651. n. 16 (1892) (partim).
Theretra salvini, id., *l.c.* p. 657. n. 83 (1892) (Guatemala).
Theretra spec. D, Bönninghausen, *Iris* xii. p. 130. n. 62 (1898) (Rio de Jan.).

♂. External spur of midtibia shorter than internal : hindtibia of ♂ long-scaled dorsally and ventrally, consequently appearing very broad and compressed. Dark brown middle line of mesothoracical tegula continued to palpus ; abdomen with an ochraceous middle line bordered by thin grey lines, a brown lateral line bordered below by a pale buff one on segments 3 to 7. Hinder angle of forewing extremely obtuse : discal line 1 not distinct, within a chocolate-brown area, which is bordered distally by a white line upon SC^5 and posteriorly by discal line 2 ; discal lines 3 and 4 close together, 5 broad from apex to R^3, then vestigial, 6 parallel to margin, obsolete behind ; interspaces between 2 and 4 pale, more or less buff.—— Hindwing uniform in colour, with traces of two series of discal vein-dots.

Underside : the brown marginal area of the forewing joined to discal area between R^2 and R^3 ; three or four discal lines, more or less abbreviated in front, 3 and 4 merged together behind and bordered here distally by a creamy buff line ; costa more or less yellowish buff at apex. Distal marginal area of hindwing irrorated with creamy buff and brown scales, with the former especially before M^2 ; three discal lines, the first abbreviated, often absent, the other two close together, reaching R^1 or SC^2.

♂. Tenth abdominal tergite truncate-sinuate, of the usual form ; sternite also not differing from that of the allied species, minutely pointed in middle. Process of harpe slightly spatulate, feebly curved upwards at end. Incrassate dorso-apical margin of the penis-sheath terminating at the right side in a dentate process, which is preceded by a few teeth ; at the left side the sheath bears a regular row of teeth.

Early stages not known.

Hab. Neotropical Region : Guatemala to Rio de Janeiro and Peru.

Though the present insect was well figured by Clerck and recognisably described by Linné as *thyelia*, this name has been applied to a very different insect of the Indo-Australian fauna by all recent authors, who, blindly following Fabricius and Walker, did not trouble to compare Linné's description or Clerck's figure.

In the Tring Museum 19 ♂♂ from : Merida, Venezuela (Briceno) ; Rio Dagua, Colombia (Rosenberg) ; Santo Domingo, Carabaya, S.E. Peru, 6000 ft., xii. 1901, i.—vi. 1902 (Ockenden), during the dry and wet seasons.

CLIV. PHANOXYLA gen. nov.—Typus : *hystrix*.

♂. Differs from *Xylophanes* in the second segment of the palpus having a large apical tuft of scales on the inner surface as in *Hippotion*. Distal margin of forewing irregular, excised between R^2 and M^1.

Palpus and eye large. No eye-lashes. Comb of midtarsus prominent. Spines of posterior abdominal tergites uniseriate, strong and long, with some weak spines between them.——Sexual armature similar to that of *Xylophanes* ; friction-scales very numerous.

Early stages not known.

Hab. Neotropical Region.

One species.

An exaggerated development of the group of *Xylophanes* to which belong *ceratomioides*, *media*, etc. The species is of particular interest, as the second segment of the palpus is on the innerside as in some Old World genera, while the first segment is like that of the New World genus *Xylophanes*.

671. Phanoxyla hystrix.

**Chaerocampa hystrix* Felder, *Reise Novara, Lep.* t. 76. f. 5 (1774) (Amazons ;—Mus. Tring).
Chaerocampa hystrix, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 271. n. 63 (1875).
Chaerocampa (?) hystrix, Butler, *Trans. Zool. Soc. Lond.* ix. p. 563. n. 54 (1877).
Theretra (?) hystrix, Kirby, *Cat. Lep. Het.* i. p. 658. n. 99 (1892).

♂. In pattern nearest to *Xylophanes ceratomioides*. Pale discal band of hindwing separated into spots.——Tenth tergite narrow, truncate-sinuate at tip ; sternite slightly acuminate. Harpe larger than in *X. ceratomioides*, but of nearly the same structure. Penis-sheath with a rather long and broad dentate process at the right side, and a shorter, hand-shaped, dentate left process.

Hab. Amazons.

In the Tring Museum 1 ♂ from the Amazons (Bates), ex coll. Felder, *type*.

In coll. Charles Oberthür a splendid ♂ from Sao Paulo d' Olivenca, Amazons, vi. vii., 1883 (M. de Mathan).

CLV. CELERIO.—Typus : *gallii*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Spectrum Scopoli, *Intr. Hist. Nat.* p. 414 (1777) (= *Sphinx*, includes type of *Sphinx*).
Deilephila Laspeyres, *Jenaische Allg. Literatur-Zeit.* iv. p. 99 (1809) (partim ; type : *nerii*).
Celerio Oken, *Lehrb. Naturg.* iii. 1. p. 761 (1815) (type : *gallii*).
Phryxus Hübner, *Verz. bek. Schm.* p. 137 (1822) (partim ; type : *lineata*).
Dilephila, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 97 (1892).

♂♀. First segment of palpus on inner surface without regular dense scaling at apex, second segment without apical tuft of long scales on innerside. Eye lashed. Antennae incrassate distally, club-shaped in ♀. Abdominal spines rather strong, especially on tergites, in three sizes, with some intermediate ones, generally triseriate, never uniseriate, much fewer in number than in *Pergesa*. External spines of foretarsus more or less prolonged, always longer than the respective spines on the innerside of the tarsus ; comb of mid- and hindtarsus vestigial, the spines not being much prolonged ; first segment of hindtarsus shorter than the tibia, about twice the length of the long tibial spur, this more than twice the length of the short spur ; pulvillus present or vestigial. Distal margin of wings entire : SC^2 and R^1 of hindwing separate or from a point, occasionally shortly stalked : R^2 central, or a little before centre ; D^3 longer than D^1.

♂. Sexual armature nearly the same in all the species. Tenth tergite simple, narrowing apically, convex above, feebly curved at end, almost straight in side-view, tip rounded or truncate, sometimes feebly emarginate ; sternite broader than tergite, boat-shaped, being prismatically compressed, apex rounded or obtusely acuminate. Clasper broadly sole-shaped ; friction-scales numerous and in most species small ; harpe ending in a thin, more or less curved, simple, tapering process (Pl. LII. f. 8). Penis-sheath (Pl. LVI. f. 56) : dorsal apical edge incrassate, dentate, produced at the left side (right in figure) into a short process ; the length of the brim-like incrassation, as well as the dentition, slightly different in the various species.

♀. Eight tergite sinuate mesially. Vaginal plate obtusely triangular, without special armature ; orifice large, mesial.

Larva cylindrical, somewhat tapering in front, with a dorso-lateral line, or a complete series of dorso-lateral ocelli, which are sometimes vestigial.—Food-plants: *Euphorbiaceae*; *Rubiaceae*; etc.

Pupa: tongue-case feebly prominent basally in most species, more enlarged in *lineata*, not keeled; abdomen punctured and rugate, without spine-like tubercles; cremaster bifid at tip.

Hab. A cosmopolitan genus, but absent from the Indo-Malayan and Papuan countries, Australia excepted.

Thirteen species.

Key to the species:

a. Pulvillus present		*b.*
Pulvillus vestigial, represented by a very small process or flap		*h.*
b. Veins traversing brown band of forewing pale; pale band sharply defined	683.	*C. lineata.*
As before, but pale band not sharply defined proximally	684.	*C. calverleyi.*
Veins not pale		*c.*
c. Abdomen with two sharply marked black side-patches		*d.*
Abdomen with more than two black side-patches, sometimes not sharply marked		*e.*
d. Costal area of forewing, above, brown from base to apex, sharply marked	675.	*C. gallii.*
Costal area of forewing pale, with a large patch beyond apex of cell, a sharply defined broad basal band	679.	*C. nicaea.*
No sharply marked costal area, basal band vestigial, the whole wing shaded with brown	676.	*C. biguttata.*
e. A sharply marked brown costal area from base to apex, incised at the veins	677.	*C. euphorbiarum.*
No sharply marked brown costal area, from base to apex		*f.*
f. Underside of wings orange-chrome from base to disc		*g.*
Underside of wings grey and brown, with a more or less obvious red tint	678.	*C. annei.*
g. Orange-chrome area of hindwing above extending to base	672.	*C. calida.*
Hindwing black from base to end of cell	673.	*C. wilsoni.*
h. Forewing, above, unicolorous, with barely a trace of markings	681.	*C. respertilio.*
Forewing, above, with brown discal band		*i.*
i. Black or brown basal patch of forewing, above, not extending to costa	682.	*C. hippophaes.*

Black or brown basal patch extending to costa, or the whole costal area brown . . . *j*.

j. Costal area of forewing, above, brown from base to apex, sharply defined, veins not pale within brown discal band; distal marginal band little paler than discal band; underside not rosy red . . . . . 680. *C. zygophylli*.

If costal area all brown, then discal band traversed by pale vein-streaks, or distal marginal band pale, or underside rosy red . . . . . 674. *C. euphorbiae*.

672. Celerio calida.

**Deilephila calida* Butler, *Ann. Mag. N. H.* (5). vii. p. 317 (1881) (Oahu;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 666. n. 14 (1892); Rothsch., Nov. Zool. ii. t. 9. f. 1 (1895); Meyr., in Sharpe, *Fauna Hawaii.* i. 2. p. 192. n. 3 (1899).

♂ ♀. Pulvillus present, large. Spines of first row of first protarsal segment not essentially prolonged, numerous. Antenna brown-scaled, except at tip, where the scaling is white. Abdomen with white lateral spots. Brown discal band of forewing, above, curving costad in front. Hindwing above and the greater part of under surface of wings, orange-chrome, sides and under surface of body washed with the same colour; base of hindwing, above, a large anterior discal patch and the distal border brownish black, often nearly the whole basal area black.

♂. Friction-scales large and few in number; harpe pointed as in *euphorbiae*.

Early stages not known.

Hab. Sandwich Islands: Oahu; Hawaii.

In the Tring Museum 1 ♂, 1 ♀ from: Mauna Kea, Hawaii.

673. Celerio wilsoni.

**Deilephila wilsoni* Rothschild, Nov. Zool. i. p. 83 (1894) (Hawaii;—Mus. Tring); id., *l.c.* ii. t. 9. f. 2 (1895); Meyr., in Sharp, *Fauna Hawaii.* i. 2. p. 192. n. 4 (1899).

**Deilephila pyrias* Meyrick, *l.c.* p. 191. n. 2 (1899) (Oloa and Hilo, Hawaii; 2000 ft.. i. vi. ix. xi. xii.;—Mus. Brit.).

♂ ♀. Easily distinguished from the preceding by the base of the hindwing being entirely black and the different pattern of the upperside of the forewing, the middle of the wing being occupied by a broad, ill-defined, brown-black band, which is forked in front and merged together behind with the likewise ill-defined externo-discal band. The forewing of *calida* is of the *euphorbiae* type, while that of *wilsoni* has quite a different aspect in consequence of the presence of the median band; the pattern of forewing of *wilsoni* is more generalised. Abdomen with interrupted yellowish belts.

Not dissected.

Hab. Sandwich Islands: Hawaii.

In the Tring Museum 1 ♂ (damaged, *type*) from Hawaii.

674. Celerio euphorbiae.

Sphinx euphorbiae Linné, *Syst. Nat.* ed. x. p. 492. n. 17 (1758).

♂ ♀. Pulvillus vestigial. Scaling of antenna white. External row of spines of first protarsal segment simple, the spines denser at the base, sometimes reduced in

number and then partly prolonged. A geographically and individually variable insect. Apex of antenna see Pl. LX. f. 12.

♂. Harpe rather long, thin, slightly curved (Pl. LII. f. 8). The incrassate dentate rim of the penis-sheath (Pl. LVI. f. 56) narrow, generally dentate all along the edge.

Larva variable geographically and individually : head red, with or without a black patch on each side above ; pronotal shield generally red in middle, a red dorsal line, sometimes replaced by a grey one, seldom vestigial ; a row of dorso-lateral rounded spots, yellowish white or reddish, below it there is often another series of smaller spots ; a dorso- and a ventro-lateral yellowish band, often absent ; ground-colour very variable, from yellow to black, the dark forms mostly finely dotted with pale yellow or grey.—Food-plant : *Euphorbia*.

Pupa rather stout, clay-colour.

Hab. Palaearctic Region, from the Canaries eastwards to Transbaikalia, southward to N.W. India.

The caterpillar is a very interesting subject for the study of the evolution of pattern. A long series of each brood from the various countries should be compared. The absence of the second lateral row of spots from some geographical forms is a curious feature.

a. C. euphorbiae dahli.

Sphinx dahlii Geyer, in Hübn., *Samml. Eur. Schm., Sphing.* t. 36. f. 161—164 (1827) ; Frey., *Beitr. Schm.* ii. p. 71. t. 69. f. 2 (1829) ; Meig., *Syst. Beschr. Schm.* p. 141. n. 11. t. 65. f. 5 (1829).

Deilephila dahlii, Rambur, *Ann. Soc. Ent. France* p. 266 (1832) (Corsica) ; Boisd., Ramb. & Grasl., *Hist. Icon. Chenill., Sphing* t. 5. f. 1. 2 (1832) ; Boisd., *Icon. Hist. Lép.* ii. p. 28. n. 6. t. 50. f. 2, 3 (1834) ; Friv., in Silberm., *Rev. Ent.* ii. p. 181 (1834) ("Hungary" *err. loci*) ; Treit., in Ochs., *Schm. Eur.* x. p. 132 (1834) ; Dup., in God., *Lép. France, Suppl.* ii. p. 7. n. 1. t. 1. f. 1 (1835) ; Pierr., *Bull. Soc. Ent. France* p. 38 (1842) ; id., *l.c.* p. 64 (1842) (larva) ; id., *l.c.* p. 72 (1847) (var.) ; Walk., *List Lep. Ins. B. M.* viii. p. 169. n. 8 (1856) (partim) ; Mab., *Ann. Soc. Ent. France* p. 556 (1866) (Corsica) ; Boisd. *Spec. Gén. Lép. Hét.* i. p. 165. n. 8 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 569. n. 11 (1877) ; Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 208 (1882) (larva) ; Kirby, *Cat. Lep. Het.* i. p. 665. n. 11 (1892) ; Hofm., *Grossschm.* p. 30. n. 7. t. 17. f. 7 (1894) ; Bartel, in Rübl, *Grossschm.* ii. p. 96 (1899) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 102. n. 748 (1901).

Deilephila dahlii (!), Hofmann, *Raup. Grossschm.* p. 29. t. 13. f. 3 (1893).

♂ ♀. Abdomen with three black side-spots, instead of two, having an additional one on the fourth segment. Mesothoracical tegula with white upper border. Disc of forewing generally with a line from the costal patch backwards.

Larva with two rows of rather small lateral spots, densely and very minutely dotted with grey, dorso-lateral spot of eleventh segment long. Spines of first protarsal segment not obviously prolonged.

Hab. Corsica and Sardinia.

In the Tring Museum 2 larvae, 17 ♂♂, 11 ♀♀ from Corsica and Sardinia.

b. C. euphorbiae tithymali.

Deilephila tithymali Boisduval, *Icon. Hist. Lép.* ii. p. 30. n. 7. t. 51. f. 1 (1834) ("Andalusia" ex err! Canary Is.) ; Dup., in God., *Lép. France, Suppl.* ii. p. 117. t. 10. f. 1. a. b. (1835) ; Herr.-Sch., *Schm. Eur.* ii. p. 87. n. 16. t. 1. f. 1. 2 (1843) (Canary Is, ; "Andalusia" *err. loci*) ; Walk., *List Lep. Ins. B. M.* viii. p. 168. n. 5 (1856) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 167. n. 9 (1875) (partim) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 570. n. 12 (1877) ; Christ, *Mitth. Schweiz. Ent. Ges.* vi. p. 346 (1882) ; id., *l.c.* viii. p. 100 (1889) ; Kirby, *Cat. Lep. Het.* i. p. 666. n. 15 (1892) ; Reb. & Rog., *Ann. Hofmus.* ix. p. 43 (1894) ; White, *Butt. Moths Teneriffe* p. 67. t. 4. f. 4 (1894) ; Bartel, in Rühl, *Grossschm.* ii. p. 93 (1899) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 102. n. 746 (1901).

Sphinx galii, Borg, in Silberm., *Rev. Ent.* ii. p. 179 (1834) (Canaries).
Sphinx tithymali, Rambur, *Faune Andal.* p. 333 (1842) (? Spanish).
Deilephila lathyrus ?, Baker, *Trans. Ent. Soc. Lond.* p. 204 (1891) (Madeira).
Deilephila tithymali ?, id., *l.c.* p. 204 (1891) (Madeira).
Deilephila dahli var. *tithymali*, Alphéraky, in Rom., *Mém. Lép.* v. p. 223. n. 19 (1889) (Teneriffe).

♂ ♀. Body and wings below much more brown than in the other forms, wings densely speckled with brown. Brown costal area of forewing above generally broad. Upper edge of mesothoracic tegula white. Abdominal sternites with white edges.

Larva with one row of side-spots, the second row vestigial ; densely dotted with grey.

Hab. Canary Islands : Teneriffe ; Orotawa.

In the Tring Museum 1 larva, 7 ♂♂, 7 ♀♀.

c. C. euphorbiae mauretanica.

Deilephila tithymali, Bellier (*non* Boisduval, 1834), *Bull. Soc. Ent. France* p. 45 (1848) (larva) ; Luc., *ibid.* p. 47 (1848) (larva) ; Bell., *Ann. Soc. Ent. France* p. 488. fig. (1848) (larva) ; Oberth., *Et. Ent.* i. p. 32. t. 2. f. 1. a. b. c. (1876) (Lambèze ; Biskra) ; Oberth., *l.c.* vi. p. 63 (1881) (= *mauritanica* ; discussed *nicaea*, *dahli*, etc.).

Deilephila euphorbiae, Lucas, in *Expl. Sc. Algérie, Zool.* p. 370. n. 65. t. 2. f. 8. a—d (1849) ; id., in Chenu, *Enc. Hist. Nat.*, Pap. i. p. 259. fig. 460 (1853) ; id., *Bull. Soc. Ent. France* p. 13 (1858) (Algiers, pale).

Deilephila mauretanica Staudinger, in Staud. & Wocke, *Cat. Lep.* ed. ii. p. 36. n. 466 (1871) (nom. nov. loc. *tithymali* et *euphorbiae* auct. ; Maur ; "Mad." *loc. err.*) ; Oberth., *Et. Ent.* i. p. 32 (1876) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 570. n. 13 (1877) ; Aust., *Le Nat.* viii. p. 260 (1886) ; Kirby, *Cat. Lep. Het.* i. p. 666. n. 16 (1892) ("Madeira" loc. err.) ; Bartel, in Rühl, *Grossschm.* ii. p. 77 (1899) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 102. n. 747 (1901).

Deilephila mauretanica ab. *deserticola* Bartel, in Rühl, *Grossschm.* ii. p. 79 (1899).

Deilephila mauretanica var. (et ab.) *deserticola*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 102. n. 747. a (1901).

♂ ♀. A pale form. Abdominal segments edged with white above and below. Costal area of forewing above extended brown, veins within brown discal band generally more or less pale. Outer spines of first protarsal segment stout.

Larva with one row of dorso-lateral spots. Side-bands rather bright yellow.

Hab. North Africa : Morocco ; Algiers.

In the Tring Museum 8 larvae, 16 ♂♂, 7 ♀♀ from : Morocco ; Algiers.

d. C. euphorbiae euphorbiae.

Hoefn., *Archet.* ii t. 8 (1592) ; id., *Dir. Ins.* t. 8. f. 3 (1630) ; Mouf., *Theatr. Ins.* p. 93. fig. 3 (1634) ; Merian, *Eur. Ins.* iii. t. 22 (1683) ; Frisch, *Ins.* ii. p. 43. n. 12. t. 11. f. 7 (1721) ; Réaum., *Hist. Ins.* i. p. 289. t. 13. f. 4—7 (1734) ; Roes., *Ins. Belust.* i. p. 17. t. 3. f. 4. 5 (1746) ; Lederm., *Nachlese* p. 48. t. 26—29 (1762) ; Geoffr., *Hist. Ins.* ii. p. 87. n. 11 (1763) ; Gronov., *Zoophyl.* p. 202. n. 822 (1764) (partim ?) ; Seba, *Thesaur.* iv. t. 53. f. 11 (1765) ; Harris, *Aurel.* p. 87. t. 44. f. a. c (1766) ; Schaeff., *Icon. Ratisb.* t. 99. f. 3. 4 (1766) ; Ernst & Engr., *Lép. Eur.* iii. p. 86. t. 107. f. c—f (1782).

Sphinx euphorbiae Linné, *Syst. Nat.* ed. x. p. 492. n. 17 (1758) (partim) ; id., *Fauna Suec.* ed. ii. p. 287. n. 1086 (1761) ; Poda, *Mus. Graec.* p. 81. n. 5 (1761) (partim) ; Scop., *Ent. Carn.* p. 186. n. 471 (1763) ; Müll., *Fauna Frid.* p. 37. n. 313 (1764) ; Houtt., *Nat. Hist.* i. 11. p. 445. n. 17 (1767) (partim) ; Linné, *Syst. Nat.* ed. xii. p. 802. n. 19 (1767) ; Beckm., *Epit.* p. 161. n. 11 (1767) (partim) ; Goeze, in *Bonnet's Abhandl.* p. 93. n. 1 (1773) ; Drury, *Illustr. Ex. Ins.* i. p. 64. t. 29. f. 3 (1773) ; Müll., *Naturs.* v. 1. p. 611. n. 19 (1774) ; Fabr., *Syst. Ent.* p. 541. n. 17 (1775) (partim) ; Fuessly, *Verz. Schweiz. Ins.* p. 32. n. 620 (1775) ; Müll., *Zool. Dan. Prodr.* p. 116. n. 1310 (1776) ; Den. & Schiff., *Verz. Schm. Wien* p. 42. n. 1 (1776) ; Gron., *Naturf.* x. p. 110 (1777) ; Mad., ed. Kleem., *Raupenkal.* p. 52. n. 141, p. 70. n. 199 (1777) ; Meyer, in Fuessly, *Mag. Ent.* i. p. 226 (1778) ; Blumenb., *Handb. Naturg.* p. 365. n. 9

(1779) (partim) ; Esp., *Schmett.* ii. p. 100. n. 11. t. 11 (1779) ; Goeze, *Ent. Beytr.* iii. 2. p. 170. n. 19 (1780) ; Fabr., *Spec. Ins.* ii. p. 146. n. 32 (1781) (partim) ; id., *Mant. Ins.* ii. p. 95. n. 35 (1787) ; Borkh., *Schm. Eur.* ii. p. 77. n. 6 (1789) ; Gmel., *Syst. Nat.* i. 5. p. 2383. n. 19 (1790) (partim) ; Rossi, *Fauna Etr.* ii. p. 161. n. 1051 (1790) ; Brahm, *Insectenkal.* ii. 1. p. 426. n. 298 (1791) ; Borkh., *Rhein. Mag.* i. p. 316 (1793) ; Fabr., *Ent. Syst.* iii. 1. p. 367. n. 37 (1793) ; Don., *Brit. Ins.* iii. p. 51. t. 91 (1794) ; Prunn., *Lep. Pedemont.* p. 85. n. 172 (1798) ; Schrank, *Fauna Boica* ii. 1. p. 226. n. 1390 (1801) ; Illig., *Mag. Ins.* ii. p. 35 (1803) (Linné's descr. crit.); Walck., *Faune Paris.* ii. p. 278 (1802) ; Hübn., *Samml. Eur. Schm., Sphing.* t. 12. f. 66 (180 ?); id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. *Leg.* B, d. f. 2. a. b. (180–?) ; Ochs., *Schm. Eur.* ii. p. 223. n. 4 (1808) ; Nag., *Hülfsb. Schm.* p. 156 (1818) ; Latr., in *Nouv. Dict. Hist. Nat.* xxii. p. 25 (1819) ; Sam., *Ent. Comp.* p. 244 (1819) ; God., *Lép. France* iii. p. 33. t. 17. f. 2 (1823) ; Lep. & Serv., *Enc. Méth.* x. p. 465. t. 64. f. 4—6 (1825) ; Boisd., *Ind. Meth.* p. 33 (1829) ; Meig., *Handb. Schm.* p. 97. n. 11 (1827) : id., *Syst. Beschr. Schm.* p. 138. n. 7. t. 65. f. 2 (1830) ; Brullé, *Exp. Morée, Zool.* p. 285. n. 602 (1832) (larva v. vi. ix.) ; Luc., *Lép. Eur.* p. 114. t. 43 (1834) ; Thon, *Nat. Schm.* p. 106. t. 53. f. 731—734 (1837) ; Ramb., *Faune Andal.* p. 333 (1842) ; Eversm., *Fauna Volgo-Ural.* p. 111 (1844) (v. vi.) ; Herr.-Sch., *Eur. Schm.* ii. p. 88. n. 19. f. 7. 8 (1847) ; Brutt., *Progr. Gymn. Dorpat* p. 23. n. 6 (1872) (vi.—viii.).

Sphinx esulae Hufnagel, *Berl. Mag.* ii. p. 180. n. 9 (1766).

Sphinx euphorbii (!), Hoffmann, *Naturf.* i. p. 244 (1774).

Sphinx esulae, seu *euphorbiae*, Rottenburg, *Naturf.* vii. p. 105 (1775).

Sphinx euphorbiae : (*cyparissias*), Gleditsch, *Einleit. Forstwiss.* ii. p. 196. n. 5 (1775).

Celerio euphorbiae, Oken, *Lehrb. Naturg.* iii. 1. p. 761. n. 2 (1815).

Deilephila euphorbiae, Ochsenheimer, *Schm. Eur.* iv. p. 43. n. 9, p. 181. n. 9 (1816) ; Curtis, *Brit. Ent.* i. t. 3 (1823) ; Steph., *Illustr. Brit. Ent., Haust.* i. p. 124. n. 1 (1828) ; id., *Cat. Brit. Ins.* ii. p. 32 (1829) ; Boisd., Ramb. & Grasl., *Hist. Icon. Chenill., Sphing.* t. 1 (1832) ; Cant., in Silberm., *Rer. Ent.* i. p. 77 (1833) (Dept. Var, vi., ix.) ; Treit., in Ochs., *Schm. Eur.* x. p. 131 (1834) ; Dup., *Icon. Chenill.* t. 4. f. 1. a. b (1832—42) ; Blanch., *Hist. Nat. Ins.* iii. p. 479 (1840) ; Westw. & Humphr., *Brit. Moths* i. p. 16. t. 4. f. 1. 2. 3 (1843) : Treit., *Hülfsb. Schm.* p. 107. n. 11 (1844) ; Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847) ; Walk., *List Lep. Ins. B. M.* viii. p. 165. n. 2 (1856) ; Batho, *Ent. Weekly Intellig.* viii. p. 171 (1860) (Britain) ; Wilde, *Raup.* ii. p. 82. n. 9. t. 2. f. 29 (1860) ; Wallengr., *Skand. Het. Fjär.* p. 38. n. 1 (1863) ; Led., *Wien. Ent. Mon.* vii. p. 22 (1863) (Bulg. ; Rumel.) ; Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Gav., *ibid.* x. p. 197. n. 72 (1867) (Groningen) ; Snell., *Vlind. Nederld.* p. 96 (1867) (vi. vii.) ; Led., *Ann. Soc. Ent. Belg.* xiii. p. 28 (1869) (Cauc. ; Talysch ; this subsp. ?) ; Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 71 (1870) (Breda) ; Gooss., *Ann. Soc. Ent. France* p. 118 (1871) (var. of larva) ; Weston, *Ent. Mo. Mag.* viii. p. 162 (1872) (Southampton) ; Higgins, *Proc. Ent. Soc. Lond.* p. 26 (1873) (Harwich) ; Buckl., *Ent. Mo. Mag.* xi. p. 73 (1874) (descr. of larvae) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 162. n. 4 (1875) ; Higgins, *l.c.* p. 30 (1876) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 570. o. 15 (1877) ; Weir, *Entom.* xiii. p. 218 (1880) (sound of pupa) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 44 (1880) ; Weism., ed. Meld. *Stud. Theor. Desc.* i. p. 201. t. 5. f. 37—44 (1882) (larvae) ; Rom., *Mém. Lép.* i. p. 70 (1884) (Borjom ; Tiflis) ; Lampa, *Ent. Tidskr.* vi. p. 27. n. 114 (1885) ; Berth., *Bull. Soc. Ent. France* p. 157 (1888) (larva on *Vitis* in captiv.) ; Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889) ; Kirby, *Cat. Lep. Het.* i. p. 666. n. 17 (1892) ; Hofm., *Raup. Grossschm.* p. 29. t. 7. f. 6 (1893) ; id., *Grossschm.* p. 30. n. 5. t. 17. f. 5 (1894) ; Barrett, *Lep. Brit. Is.* ii. p. 36. n. 1. t. 48 (*l.*, *b.*) (1895) ; Bartel, in Rübl, *Grossschm.* ii. p. 79 (1899) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 102. n. 749 (1901).

Sphinx euphorbia (!), Harris, *Engl. Lep.* p. 24. n. 159 (1775).

Sphynx euphorbiae, Vogel, *Schmett. Cab.* i. p. 26. t. 7. f. 6. a. b (1821).

Hyles euphorbiae, Hübner, *Verz. bek. Schm.* p. 137. n. 1475 (1822).

Dilephila (!) *euphorbiae*, Guérin, *Icon. Règne Anim.* ii. p. 494 (1844).

Deilephila mauritanica, Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 41 (1889) (Sicily ?).

Deilephila euphorciae (!), Thierry-Mieg, *Le Nat.* xi. p. 181 (1889).

Dilephila euphorbiae, Kirby, in Allen, *Nat. Libr., Moths* iv. p. 32. t. 101 (1897).

♂♀. *Underside* of wings and body rosy red. Abdominal sternites with pale edges. Outer spines of first protarsal segment partly stout and somewhat prolonged. Costal area of forewing above as a rule not extended brown, the patch beyond apex of cell isolated. Mesothoracical tegula seldom with white upper border.

Larva with a double row of lateral spots, the dark parts densely dotted with

yellow. In a black specimen from Saratow the second row of spots vestigial ; two pale examples from the same place have two rows of spots.

Hab. Europe ; from Spain to Morea and the Caucasus, northward to the South Coast of England, Southern Sweden.

In the Tring Musum 22 caterpillars, 2 pupae, and 80-odd specimens.

It is quite possible, even probable, that at least the caterpillars from the varions districts are different. A series should be compared especially from Spain, Italy, Greece, and Southern Russia.

This subspecies is individually variable. The principal varieties are the following :

a'. C. euphorbiae euphorbiae f. *paralias.*

Deilephila euphorbiae var. *paralias* Nickerl, *Böhm. Tag.* p. 22. f. 2 (1837) (Veuedig) ; Kirby, *Cat. Lep. Het.* i. p. 666. n. 17. a (1892).
Deilephila euphorbiae ab. *paralias*, Romanoff, *Mém. Lép.* i. p. 70 (1884) (Borjom) ; Staud. & Rebel, *Cat. Lep.* ed. iii. p. 102. n. 749. a (1901).
Deilephila euphorbiae var. (et ab. ?) *paralias*, Bartel, in Rühl, *Grossschm.* ii. p. 85 (1899).

A large, sharply marked, reddish form.

b'. C. euphorbiae euphorbiae f. *rubescens.*

Deilephila euphorbiae ab. *rubescens* Garbowski, *Sitz. Ber. Ak. Wiss. Wien* p. 917 (1892) ; Bartel, *l.c.* p. 86 (1899).

Differs from ordinary specimens in being more red.

c'. C. euphorbiae euphorbiae f. *grentzenbergi.*

Sphinx nicaea?, Ochsenheimer, *Schm. Eur.* ii. p. 225 (1808) (Portugal).
Deilephila euphorbiae var. *grentzenbergi* Staudinger, *Ent. Nachr.* xi. p. 10 (1885) (Capri) ; Austaut, *Le Nat.* viii. p. 259 (1886) ; Kirby, *l.c.* (1892) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 102. n. 749. b (1901).
Deilephila euphorbiae var. (et ab.) *grentzenbergi*, Bartel, *l.c.* ii. p. 86 (1899) (Capri ; Lissabon ; Toulouse).

Upperside of wings brighter rosy red than in the preceding.

It would perhaps be wise to keep forms *a'*, *b'*, and *c'*, under one head ; they intergraduate so completely that it is impossible to say where the one begins and the other ends.

The following forms have more the nature of true aberrations :

d'. C. euphorbiae euphorbiae ab. *helioscopiae.*

Sphinx euphorbiae, Selys-Longch., *Bull. Soc. Ent. France* p. 110 (1856) (var.) ; Boisd., *ibid.* (1856).
Deilephila euphorbiae var. *helioscopiae* Selys-Longch., *Ann. Soc. Ent. Belg.* i. p. 40 (1857).
Deilephila euphorbiae, Calberla, *Iris* i p. 141 (1887) (Firenze).
Deilephila euphorbiae ab. *helioscopiae*, Bartel, *l.c.* ii. p. 88 (1899).
Deilephila euphorbiae ab. *defecta* id., *l.c.* ii. p. 88 (1899).

Hindwing without black submarginal band.

e'. C. euphorbiae euphorbiae ab. *lafitolei.*

Deilephila euphorbiae ab. *lafitolei* Thierry-Mieg, *Le Nat.* xi. p. 181 (1889) (Pyrenees) ; Bartel, *l.c.* ii. p. 87 (1899).
Deilephila euphorbiae ab. *lafitchii* (!), Kirby, *Cat. Lep. Het.* i. p. 666. n. 17. b (1892) (laps. cal.).
Deilephila euphorbiae ab. *latifolii* (!), Staudinger, in Staud. & Reb, *Cat. Lep.* ed. iii p. 102. sub n. 749 (1901) (laps. cal.).

Yellow instead of red.

f'. C. euphorbiae euphorbiae ab. *nigrescens* nom. nov.

Deilephila esulae Boisduval (*non* Hufnagel, 1766), *Icon. Hist. Lép.* ii. p. 26. t. 50. f. 1 (1834) (Italy); Dup., in God., *Lép. France, Suppl.* ii. p. 18. n. 4. t. 2. f. 1 (1835); Frey., *N. Beytr.* iv. p. 5. n. 475. t. 291. f. 1 (1842); Herr.-Sch., *Eur. Schm.* ii. p. 88. f. 3 (1847); Led., *Verh. Zool. Bot. Ges. Wien* ii. p. 91 (1852); Walk., *List Lep. Ins. B. M.* viii. p. 166. n. 3 (1856); Dep., *Bull. Soc. Ent. France* p. 28 (1868) (painted specim.); Künk., *ibid.* p. 39 (1868); Selys-Longch., *C. R. Soc. Ent. Belg.* xi. p. 16 (1868); Boisd., *Spec. Gén. Lép. Hét.* i. p. 163. n. 5 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 571. n. 19 (1877); Cure, *Bull. Soc. Ent. Ital.* xxi. p. 80 (1890).

Deilephila euphorbiae? ab? *esulae*, Staudinger & Wocke, *Cat. Lep.* p. 16. n. 16. b (1861).

Deilephila euphorbiae ab. *esulae*, Romanoff, *Mém. Lép.* i p. 70 (1884) (Tiflis, 1 ♂); Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889); Bartel, *l.c.* ii. p. 87 (1899).

Deilephila euphorbiae, Ribbe, *Iris* ii. p. 186. t. 4. f. 4 (1889).

Deilephila euphorbiae var. *esulae*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 102. n. 749. c (1901).

Costal area of forewing above extended blackish brown, brown discal band also deeper in tint than in the ordinary *euphorbiae*.

The specimen figured by Ribbe is an extreme development, the pale area of the forewing being reduced to a narrow band.

g'. C. euphorbiae euphorbiae ab. *restricta* (Pl. VIII. f. 14, ♂).

A ♂ in the Tring Museum has the forewing entirely tawny-olive above, except a small spot at end of cell, and a series of small elongate, hastate or linear, spots on the disc upon the veins; fringe of hinder margin buffish white, that of distal margin clay-colour; marginal band deeper brown. Disc of hindwing, above, yellowish red, far less bright than in ordinary *euphorbiae*. Underside of body and wings much shaded and speckled with brown, especially the wings; forewing with very little red, hindwing yellow-red on disc.

The specimen was caught on the drilling-ground at Bamberg; we received it from A. Heyne.

c. C. euphorbiae conspicua subsp. nov.

Deilephila euphorbiae, Mann, *Wien. Ent. Mon.* vi. p. 66 (1862) (Brussa).

Deilephila euphorbiae ab. *paralias*, Staudinger (*non* Nickerl, 1837), *Hor. Soc. Ent. Ross.* xiv. p. 297 (1878) (Asia Minor); Hofm., *Grossschm.* p. 30. sub n. 5 (1894).

Deilephila euphorbiae var. (ab.) *paralias*, Heltz, *Illustr. Zeitschr. Ent.* ii. p. 63 (1897) (Cilicia, E. vii.).

Deilephila euphorbiae, Bartel, in Rühl, *Grossschm.* ii. p. 79 (1899) (partim).

Deilephila euphorbiae var. *lathyrus*, Staudinger (*non* Walker, 1856), in Staud. & Reb., *Cat. Lep.* ed. iii. p. 103. n. 749. f (1901) (partim).

♂ ♀. A large and pale form resembling small specimens of *nicaea*. Mesothoracic tegula with vestige of white upper border. Costal margin of forewing with little brown scaling, patch beyond end of cell isolated, very sharply marked, distal marginal area as pale as disc. Underside of body and wings as pale as in *centralasiae*. Spines of first protarsal segment stout.

Larva varying from yellow to black; two rows of large lateral spots; very few or no dots, differing in this respect very conspicuously from *euph. euphorbiae*.

Hab. Syria and Asia Minor.

In the Tring Museum 3 ♂♂ and 7 larvae from: Beirut (*type*); Haifa.

f. C. euphorbiae sichei.

Deilephila sichei Püngeler, *Berl. Ent. Zeit.* xlvii. p. 235. t. 3 (♂, ♀) (1903) (Bulghar Dagh).

♂ ♀. Mesothoracic tegula with pale upper border. Costal median patch of forewing much reduced on upperside, not distinct below. External spines of first

protarsal segment few in number and large, agreeing best with those of the following form.

Hab. Bulghar Dagh, Cilicia, June.

In the Tring Museum 1 ♂, 1 ♀ received from Herr M. Holtz.

g. C. euphorbiae centralasiae.

Deilephila euphorbiae, Bienert, *Lep. Erg. Reise Persien* p. 32 (1869) (Teheran, v. ; this form ?) ; Christ., in Rom., *Mém. Lép.* iii. p. 54 (1887) (Askhabad, 1 ♀, pale).

Deilephila euphorbiae var. *centralasiae* Standinger, *Stett. Ent. Zeit.* xlviii. p. 64 (1887) (Samarkand ; Namangan) ; Grum-Grsch., in Rom., *Mém. Lép.* iv. p. 511. n. 204 (1890) (Osch, v., common) ; Kirby, *Cat. Lep. Het.* i. p. 666. n. 17. d (1892) ; Bartel, in Rühl, *Grossschm.* ii. p. 89 (1899).

♂ ♀. Very pale. Abdominal sternites without distinct pale borders. White upper border of mesothoracic tegula generally vestigial, sometimes distinct. Submarginal band of hindwing less black than in the other subspecies. Distal marginal area of forewing rather darker than the disc, therefore the olivaceous band not very sharply defined distally. Outer spines of first protarsal segment long and few in number, the segment shorter than in the other subspecies. Sometimes the body and wings rosy red.

Larva with one row of lateral spots.

Hab. Transcaspia.

In the Tring Museum 1 larva, 3 ♂♂, 4 ♀♀ from : Askhabad ; Achal Tekke ; Prov. Kuliab, Afghanistan.

h. C. euphorbiae robertsi.

Deilephila euphorbiae, Bienert, *Lep. Erg. Reise Persien* p. 32 (1869).

(?) *Deilephila* spec., Christoph, *Hor. Soc. Ent. Ross.* x. p. 31 (1873) (Shahrud).

Deilephila robertsi Butler, *Proc. Zool. Soc. Lond.* p. 411. n. 25. t. 39. f. 9. 10 (*l., p.*) (1880) (Kandahar, larva common on *Euphorbia*) ; Swinh., *Trans. Ent. Soc. Lond.* p. 346 n. 1. (1885) (Kandahar, vii., common) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 21. n. 111 (1887).

Dilephila dahlii, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 99. n. 156 (1892) (Kandahar ; Simla).

Deilephila peplides Christoph, *Ent. Nachr.* xx. p. 333 (1894).

Deilephila euphorbiae var. *peplidis*, Bartel, in Rühl, *Grossschm.* ii. p. 88 (1899).

Deilephila euphorbiae var. *robertsi*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 102. n. 749. d (1901).

♂ ♀. A dark form, occurring in the same countries as *centralasiae* but probably in other stations. First protarsal segment with more and shorter external spines than in *centralasiae*. Further observations are necessary to show the true geographical relation of *peplidis* and *centralasiae*. They are not seasonal forms judging from the data given by the collectors.

Under surface of wings much speckled with brown, reminding one of *tithymali*.

Larva with a double series of lateral spots.

Hab. Transcaspia southward to Kandahar, Afghanistan.

In the Tring Museum 6 ♂♂, 5 ♀♀ from : Askhabad ; Merw, iii. iv. ; Gr. Balkan, Turcm.

i. C. euphorbiae nervosa subsp. nov.

♂. Mesothoracic tegula with white upper edge. Abdomen : two black lateral spots ; fringe of tergites not white in middle.

Wings, *upperside*. — Forewing : costal area clay-colour from base to near apex, broadly shaded with black behind from base to M^2, then sinuate ; in this sinus an indistinct black patch ; the patch beyond apex of cell merged together with costal

area, less rounded than in *euph. tithymali*, more so than in *costata*, edged with black behind ; veins traversing discal band pale like median area as in *costata* ; marginal band pale.

Underside of wings speckled with brown ; cell of forewing brown, the area ending in a blackish patch ; disc of forewing slightly pink, that of hindwing pale pink.

Hab. Sabathu, N.W. India.

Two ♂♂ in the British Museum.

Resembling *euphorbiae costata* : third abdominal segment without indication of a black patch ; underside of wings more pink.

k. C. euphorbiae costata (Pl. IX. f. 10, ♀).

Sphinx (*Deilephila*) *costata* Nordmann, *Bull. Moscou* xxiv. 2. p. 444. t. 11. f. 3. 4 (1851) (Kiachta).
Deilephila costata, Staudinger & Wocke, *Cat. Lep.* ed. ii. p. 37. n. 470 (1871) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 569. n. 10 (1877); Graes., *Berl. Ent. Zeitschr.* xxxv. p. 211 (1892) (Raddefka, ♂); Kirby, *Cat. Lep. Het.* i. p. 665. n. 10 (1892) ; Bartel, in Rühl, *Grossschm.* ii. p. 95 (1899) (Gouv. Jenisseisk and Irkutsk ; Kiachta ; Raddefka) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 103. n. 751 (1901) (Kiachta ; "Amur false").

♂♀. We do not believe that this insect is specifically distinct. We have seen only a few. Nordmann's figure is not very exact. Mesothoracic tegula with white upper border. Body above and forewing deep cinnamon-brown ; abdomen with a small brownish black side-patch on fourth segment as in *dahli*. Costal area of forewing broadly brown, sharply marked, patch beyond apex of cell merged together with it, narrower than in most forms of *euphorbiae* ; veins traversing brown discal band pale as in *nereosa* and certain *mauretanica* ; inner edge of brown band more straight behind than in the other forms of *euphorbiae*. Hindwing below with the black submarginal band (so sharply marked in Nordmann's figure) vestigial ; body and wings with little red on the under surface.

Early stages not known.

Hab. Transbaikalia ; Kiachta ; Raddefka.

In the Paris Museum 1 ♀ from Kiachta (Popoff), here figured.

675. **Celerio gallii.**

Sphinx gallii Rottenburg, *Naturf.* vii. p. 107 (1775).
Deilephila galii, Walker, *List Lep. Ins. B. M.* viii. p. 166. n. 4 (1856) (partim) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 169. n. 12 (1875).

♂♀. Confounded with *euphorbiae* by the early writers. First protarsal segment with the external row of spines complete, double at base, the spines little prolonged. Pulvillus present. Antenna above white only at end.

♂. Harpe more curved than in *euphorbiae*.

Early stages similar to those of *euphorbiae*.

Larva very variable, with few dots on back ; pale spot near base of horn always elongate ; pronotal shield often quite red.—Food-plants : *Epilobium*, *Asperula*, etc. ; said to occur also on *Euphorbia*.

Hab. Palaearctic and Nearctic Regions, as far south as the Himalayas and Georgia.

Two subspecies.

The larvae found on *Euphorbia* may be the product of hybridisation between *gallii* and *euphorbiae*.

a. C. gallii gallii.

Roes., *Ins. Belust.* iii. p. 33. t. 6. f. 1. 2 (larva) (1746); Uddm., *Dissert.* p. 57 (1753) (partim); Harris, *Aurel.* p. 87. t. 44. f. b (1766); Schaeff., *Icon. Rat.* t. 78. f. 1. 2. (1766); Deg., *Mém. Hist. Ins.* i. t. 8. f. 6—11 (1752); id., *l.c.* ii. 1 p. 236 (1771); Mad., ed. Kleem., *Raupenkal.* p. 52 (1777); Gladb., *Beschr. Eur. Schm.* p. 18. t. 9. f. 1. 2 (*i.*), p. 71. t. 32. f. 1. 23 (*l., p.*) (1777); Ernst & Engr., *Pap. Eur.* iii. p. 91. t. 109. f. 156. a.—f. (1782).

Sphinx euphorbiae Linné, *Syst. Nat.* ed. x. p. 492. n. 17 (1758) (partim; larva); Poda, *Mus. Graec.* p. 81. n. 5 (1761) (partim); Linné, *Mus. Lud. Ulr.* p. 356. n. 16 (1764); Fabr., *Syst. Ent.* p. 541. n. 17 (1775) (partim); Blumenb., *Handb. Naturg.* p. 365. n. 9 (1779) (partim); Fabr., *Spec. Ins.* ii. p. 146. n. 32 (1781) (partim); Gmel., *Syst. Nat.* i. 5 p. 2383. n. 19 (1790) (partim).

Sphinx esulae var., Hufnagel, *Berl. Mag.* ii. p. 197. n. 9 (1766) (partim); Rott., *Naturf.* vii. p. 105 (1775).

Sphinx euphorbii (!) var., Meinecke, *Naturf.* i. p. 244 (1774) (larva); Kübn, *ibid.* iii. p. 22 (1774).

Sphinx gallii Rottenburg, *l.c.* vii. p. 107 (1775); Fabr., *Gen. Ins.* p. 273. n. 17—18 (1777); Luc., *Lép. Eur.* p. 112 t. 46 (1834).

Sphinx galii Denis & Schiff., *Verz. Schm. Wien* p. 42. n. 2 (1776); Fuessly, *Mag. Ent.* i. p. 113 (1778); Esp., *Schm.* ii. p. 173. n. 27. t. 21 (1779); Goeze, *Ent. Beytr.* iii. 2. p. 210. n. 27 (1780); Fabr., *Spec. Ins.* ii. p. 147. n. 33 (1781); Lang, *Verz. Augsb.* p. 68. n. 563. 564 (1782); Retz., *Gen. Ins.* p. 34. n. 28 (1783); Fabr., *Mant. Ins.* ii. p. 95. n. 36 (1787); Borkh., *Eur. Schm.* ii. p. 81. 140. 179. n. 7 (1789); Gmel., *Syst. Nat.* i. 5. p. 2383. n. 82 (1790); Rossi, *Fauna Etr.* ii. p. 162. n. 1053 (1790); View., *Verz. Brandenb.* i. p. 7. n. 8 (1790); Brahm, *Insectenkal.* ii. 1. p. 314. n. 200 (1791); Schwarz, *Raupenkal.* p. 362. 495 (1791); Borkh., *Rhein. Mag.* i. p. 316. n. 143 (1793); Fabr., *Ent. Syst.* iii. 1. p. 368. n. 38 (1793) (partim); Illig., in Den. & Schiff., *Verz. Schm. Wien* ed. ii. p. 14. n. 2 (1880); id., *Mag. Ins.* ii. p. 35 (1803) (Linné's descr. of *euph.* critic.); Hübn., *Samml. Eur. Schm., Sphing.* p. 66. n. 6. t. 12. f. 64 (180—?); id., *Gesch. Schm.* ii. *Sphing* iii. *Leg.* B. d. f. 1. a (180—?); Ochs., *Schm. Eur.* ii. p. 217. n. 2 (1808); Haw., *Trans. Ent. Soc. Lond.* i. p. 99. t. 4 (1812); Nag., *Hülfsb. Schm.* p. 157 (1818); Sam., *Ent. Comp.* p. 244 (1819); Meig., *Handb. Schm.* p. 96. n. 10 (1827); Boisd., *Ind. Meth.* p. 33 (1829); Meig., *Syst. Beschr. Schm.* ii. p. 137. n. 6. t. 65. f. 1 (1830); Treit., *Hülfsb. Schm.* p. 167. n. 10 (1844); Brutt., *Progr. Gymn. Dorpat* p. 23. n. 5 (1872) (v. vi.).

(?) *Sphinx galii*, Fuessly, *N. Mag. Ent.* ii. p. 70, iii. p. 156. n. 122 (1785) (perhaps *philenphorbia* ?).

Celerio galii, Oken, *Lehrb. Naturg.* iii. 1. p. 761. n. 1 (1815)

Deilephila galii, Ochsenheimer, *Schm. Eur.* iv. p. 43. n. 6 (1816); Steph., *Illustr. Brit. Ent., Haust.* i. p. 125. t. 12. f. 2. (1828); id., *Cat. Brit. Ins.* ii. p. 32 (1829); Westw. & Humphr., *Brit. Moths* i. p. 18. t. 4. f. 4. 5. 6 (1843); Eversm., *Fauna Volgo-Ural.* p. 110 (1844) (v. vi.), Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847); Herr.-Sch., *Schm. Eur.* ii. p. 87. n. 18 (1857); Wilde, *Raup.* ii. p. 83. n. 10. t. 2. f. 29 (1860); Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.); Wall., *Skand. Het. Fjär.* p. 40. n. 2 (1863); Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg); Snell., *Vlind. Nederld.* p. 95 (1867) (vi. vii.); Gav., *Tijdschr. Ent.* x. p. 197. n. 71 (1867) (Groningen); Tengstr., *Act. Soc. F. F. Fenn.* x. p. 6. n. 93 (1869); Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 70 (1870) (Breda); Butl., *Trans. Zool. Soc. Lond.* ix. p. 569. n. 6 (1877); Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 44 (1880); Staud., *Hor. Soc. Ent. Ross.* xiv. p. 297 (1878) (Asia Minor ?); Thed., *Ent. Tidskr.* ii. p. 105 (1881); Alb., *Bull. Moscou.* p. 379 (1882) (Moscow); Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 211. t. 5. f. 45. 46, t. 6. f. 47. 48 (1882) (larvae); Rom., *Mém. Lép.* i. p. 70 (1884) (Borjoum, 1 specim.); Lampa, *Ent. Tidskr.* vi. p. 26. n. 113 (1885); Leach, *Proc. Zool. Soc. Lond.* p. 583. n. 12 (1888) (Fujisan, vi.; Tsuruga, vii.); Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 41 (1889) (Sicily ?); Kirby, *Cat. Lep. Het.* i. p. 665. n. 6 (1892); Hofm., *Raup. Grossschm.* p. 28. t. 7. f. 5 (1893); id., *Grossschm.* p. 30. t. 17. f. 4 (1894); Kill. & Caff., *Jahrb. Nat. Ges. Graub.* xxxviii. *App.* p. 20 (1895); Barrett, *Lep. Brit. Is.* ii. p. 42. n. 2. t. 49 (1895); Vos, *Tijdschr. Ent.* xli. p. 80 (1898) (Apeldoorn); Leech, *Trans. Ent. Soc. Lond.* p. 285. n. 58 (1898) (Fujisau, vi.; Tsuruga, vii.).

Hylesgalii, Hübner, *Verz. bek. Schm.* p. 137. n. 1470 (1822).

Sphynx galii, Vogel, *Schmett. Cab.* ii. p. 18. t. 7. f. 4. a, b (1822).

Deilephila philenphorbia Mützell, in Wiegm., *Arch. Naturg.* viii. p. 171. t. 8 (1840).

Deilephila gallii, Staudinger & Wocke, *Cat. Lep.* ed. ii. p. 36. n. 464 (1871); Siebke, *Enum. Ins. Norv.* iii. p. 24. n. 1 (1876); Graes., *Berl. Ent. Zeitschr.* xxxii. p. 104. n. 182 (1888) (Amurld.); Staud. in Rom., *Mém. Lép.* vi. p. 227. n. 213 (1892) (Amur); Herz, *Iris* xi. p. 250. n. 90 (1898) (N.E. Siber.); Bartel, in Rühl, *Grossschm.* ii. p. 71 (1899); Staud. & Reb., *Cat. Lep.* ed. iii. p. 102. n. 745 (1901).

Dilephila galii, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 98. n. 155 (1892) (Gurais Valley,

6000 ft.); Kirby, in Allen, *Nat. Libr., Moths* iv. p. 30. t. 102. f. 1 (1897); Dudg., *Journ. Bombay N. H.* xi. p. 415. n. 155 (1898) (Chumbi Valley, 13,000 ft.).

Deilephila gallii hibr. *phileuphorbia*, Bartel, in Rühl, *Grossschm.* ii. p. 75 (1899).

Deilephila gallii hybr. *phileuphorbia*, Staudinger & Reb., *Cat. Lep.* ed. iii. p. 102. n. 745. a (1901).

♂♀. A very constant insect. Discal area of hindwing above with a red patch behind middle, the red colour often extending along black basal area and postdiscal band; below there is seldom a trace of red.

Hab. Palaearctic Region, from Western Europe to Japan and the Himalayas.

In the Tring Museum 10 larvae, 2 pupae, 50-odd specimens from various places of Europe, Transcaucasia.

b. C. gallii intermedia.

Sphinx epilobii Harris (*nec* Boisduval, 1829), in Hitchc., *Rept. Massachus.* iv. p. 590 (1833); id. *l.c.* ed. ii. p. 591 (1835).

Deilephila intermedia Kirby, *Fauna Bor. Amer.* iv. p. 302 (1834); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Grote, *Proc. Ent. Soc. Philad.* v. p. 40 (1865); id. & Rob., *ibid.* p. 156. n. 46 (1865); iid., *l.c.* p. 179 (1865); Butl., *Trans. Zool. Soc. Lond.* ix p. 569. n. 8 (1877); Beth., *Canad. Ent.* xi. p. 152 (1879).

Deilephila chamaenerii Harris, in Sillim., *Journ Sc. Art* xxxvi. p. 305. n. 2 (1839); id., in Agass., *Lake Sup.* p. 387. t. 7. f. 2 (1856); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 165. n. 2 (1862); Harris, ed. Flint, *Ins. Inj. Veg.* p. 328 (1863); Lintn., *Proc. Ent. Soc. Philad.* iii. p. 661 (1864) (life hist.); Grote, *ibid.* v. p. 40 (1865); id. & Rob., *ibid.* p. 156. n. 47 (1865); Beth., *Canad. Ent.* iii. p. 83 (1871) (Lake Superior); Bowl., *ibid.* iii. p. 143 (1871) (Quebec); Streck., *ibid.* iv. p. 206 (1872) Lintn., *Ent. Contr.* i. p. 192 (1872); (N. York, v., larva in viii.); id., *l.c.* iii. p. 179 (1873); Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., vi. vii.); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 20 (1874); Edw., *Proc. Calif. Ac. Sc.* vi. p. 90 (1875) (Vancouver I.; Oregon; N. Calif.); Caulf., *Canad. Ent.* viii. p. 241 (1875) (Montreal, vi.); Saund., *ibid.* p. 64. fig. 2 (*i*) (1876) (descr. of larva); id., *Rept. Ent. Soc. Ontario* vi. p. 37 (1876); Butl., *Trans. Zool. Soc. Lond.* ix. p. 569. n. 7 (1877); Saund., *Canad. Ent.* ix. p. 63. fig. 2. 4 (1877) (Quebec; larva, food-plants); Maass., *Stett. Ent. Zeit.* xli. p. 58 (1880) (= *intermedia* = *galii*); Saund., *Ins. Inj. Fruits* p. 256. n. 137. fig. 267 (1883); Fern., *Canad. Ent.* xiv. p. 21 (1884); id., *Sphing. N. Engld.* p. 55. n. 24. t. 2. f. 1 (1886); Grote, *Hawk Moths N. Am.* p. 31 (1886); id., *Canad. Ent.* xviii. p. 132. n. 34 (1886); Trnm., *Ent. News* viii. p. 27 (1887). (S. Dakota); Edw., *Bull. U. St. N. Mus.* xxxv. p. 39 (1889) (liter. rel. to metam.); Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N. York, at electr. light)

Deilephila galii, Walker, *l.c.* (1856); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 144. n. 23 (1859); Grote & Rob., *Trans. Amer. Ent. Soc.* ii. p. 75 (1868) (= *chamaenerii*); Boisd., *Ann. Soc. Ent. Belg.* xii. p. 66. n. 69 (1868); Möschl., *Stett. Ent. Zeit.* xxxv. p. 157 (1874); Boisd., *l.c.* (1875) (partim); Möschl., *Verh. Z. B. Ges. Wien* xxxiv. p. 283 (1885) (= *galii*).

Deilephila oxybaphi Clemens, *l.c.* iv. p. 145. n. 24 (1859); Kirby, *Cat. Lep. Het.* i. p. 665. n. 7 (1892).

Deilephila canadensis Guenée, *Ann. Soc. Ent. France* p. 7 (1868) (= *chamaenerii*).

Hyles chamaenerii, Grote, *Bull. Buffalo Soc. N. Sc.* ii. p. 225. n. 24 (1875); id., *l c.* iii. p. 221. n. 26 (1877) (= *intermedia ?* = *oxybaphi ?* = *canadensis*).

Deilephila gallii, Strecker, *Lep. Rhop. Het.* p. 79 (1874); Smith, *Trans. Amer. Ent. Soc.* xv. p. 131. t. 5. f. 7. 8 (genit.) (1888) (Canada to Georgia; westward to Calif.; Labrador); Hanh., *Canad. Ent.* xxxi. p. 52 (1899) (Westminster, Brit. Col.); Heath, *ibid.* xxxiii. p. 99 (1901) (Manitoba).

Deilephila galii var. *intermedia*, Bentenmüller, *Bull. Amer. Mus. N. H.* vii. p. 286. t. 3. f. 3 (1895).

Deilephila galii var. *chamaenerii*, Hanham, *Canad Ent.* xxix. p. 292 (1897) (Manitoba).

♂♀. There is no other difference from the Palaearctic form of *gallii* than the more extended red colour of the hindwing, and the darker tint of the brown marginal and basal parts of the under surface of the wings. The pale border of the hindwing above is generally narrower than in European examples, but the character is not constant.

Hab. Nearctic Region, from Canada to Colorado and Georgia, extending in the northern district westward to Vancouver, Oregon, and Northern California.

In the Tring Museum 6 larvae, 50-odd specimens from various parts of Canada and the United States.

676. Celerio biguttata.

**Deilephila biguttata* Walker, *List Lep. Ins. B. M.* viii. p. 172. n. 15 (1856) (Madag.;—Mus. Brit.); Guen., in Vins., *Voy. Madag.* p. 30. (1865); Boisd., *Spec. Gén. Lép. Hét.* i. p. 160 n. 2 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 568 n. 3 (1877); id., *Cist. Ent.* ii. p. 393 (1879) (Antananarivo); Mab., *Ann. Soc. Ent. France* p. 296 (1879) (Madag.); Saalm., *Lep. Mad.* p. 123 n. 293 (1884); Kirby, *Cat. Lep. Het.* i. p. 664 n. 3 (1892).

Deilephila elengni Boisduval, *l.c.*

**Deilephila euphorbioides* Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 22 n. 8 (1892) ("Japan" err. loci;—Mus. Oxford); Leech, *Trans. Ent. Soc. Lond.* p. 285 n. 59 (1898) ("not seen").

♂♀. Pulvillus present. Spines of first protarsal segment not obviously prolonged. Upper edge of mesothoracic tegula not white. Abdomen with two large black lateral spots. Upperside of body dark olive-brown, underside somewhat paler; underside of wings cinnamon-brown, much speckled with deep brown, disc somewhat reddish.——Forewing above with a pale line from apex to basal third of hinder margin, area outside this line darker brown than the area between the line and costal margin; a brown postcostal patch beyond apex of cell more or less distinct generally followed by a narrower patch at fork; hinder edge of wing conspicuously white.

♂. Friction-scales large, and less numerous than in *euphorbiae, lineata*, etc.; harpe of the *euphorbiae*-type, process stouter and shorter, much stronger curved.

Early stages not known.

Hab. Madagascar.

In the Tring Museum 9 ♂♂, 9 ♀♀.

677. Celerio euphorbiarum.

Sphinx euphorbiarum Guérin & Pereh., *Gén. Ins.* t. 3. f. 1 (1835).

Deilephila celeno Boisduval, *Spec. Gén. Lép. Hét.* i. p. 170. n. 13 (1875) (Buenos Ayres; Uruguay; Chili).

**Deilephila spinifascia* Butler, *Proc. Zool. Soc. Lond.* p. 81 (1871) (Buenos Ayres; Patagonia;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 568. n. 5 (1877).

Deilephila euphorbiarum, Berg, *Bull. Moscou* p. 206. n. 17 (1875) (Patagonia; descr. of larva); id., *Act. Ac. Nac.* i. p. 83. n. 17 (1876); Butler, *l.c.* p. 630. 638 (1877) (= *spinifascia celeno*); Burm., *Descr. Rép. Argent.* v. p. 337. n. 1 (1878); id., *l.c. Atlas* p. 38. t. 16. f. 1—3. 5—8 (*l., p., i*) (1879); Bartl.-Calv., *Cat. Lep. Chile* p. 12. n. 91 (1886) (= *spinifascia* = *celeno*); Kirby, *Cat. Lep. Het.* i. p. 665. n. 3 (1892) (B. Ayres; Patagonia; Chili).

♂♀. Pulvillus present. Outer spines of first protarsal segment stout and long. Body as in *annei*, the fourth and fifth black abdominal spots often absent or vestigial. Brown costal area of forewing sharply defined, incised at the veins. Red area of hindwing variable in width. Hindwing below with two black patches before abdominal edge, one at base, the other at anal angle.

♂. Sexual armature of the same type as in *euphorbiae, gallii*, etc.; tip of harpe less acute.

Larva varying from greyish green to black; a pale dorsal line, absent or vestigial in the dark forms; a series of black, round, dorso-lateral spots encircled by a pale yellow ring.—Food-plants: *Mirabilis jalappa*; *Cestrum*; etc.

Hab. Southern district of South America: Tucuman to Patagonia; Chili; Southern Brasilia.

In the Tring Museum 14 ♂♂, 12 ♀♀ from: Chili; Buenos Ayres; La Gama, Argentina, xii.; Province of Rio de Janeiro.

678. **Celerio annei.**

Sphinx annei Guérin, *Mag. Zool.* (2). i. *Ins.* t. 2. (1839) (Santiago).

Deilephila annei, Walker, *List Lep. Ins. B. M.* viii. p. 171. n. 14 (1856); Boisd., *Spec. Gén. Lép. Hét.* i. p. 161. n. 3 (1875) (Chili; Peru; ♂, ♀); Butl., *Trans. Zool. Soc. Lond.* ix. p. 571. n. 18 (1877); Bartl.-Calv., *Cat. Lep. Chile* p. 12. n. 92 (1886); Kirby, *Cat. Lep. Het.* i. p. 667. n. 20 (1892) (Peru; Chili).

♂♀. Pulvillus present. Spines of external row of first protarsal segment stout. Upper edge of mesothoracic tegula white. Abdomen with five black side-patches, first the largest. Costal area of forewing above shaded with brown, not sharply defined, a brown patch beyond end of cell; discal area grey, becoming paler towards base, somewhat buffish or creamy along the brown discal band.

Not dissected.

Early stages not known.

Hab. Chili; Bolivia; Peru.

In the Tring Museum 6 ♀♀ from: Rancagua, Chili: La Paz, Bolivia; Carobas, Peru, xii. 1899 (Simons).

679. **Celerio nicaea.**

Sphinx nicaea Prunner, *Lep. Pedem.* p. 86 (1898).

♂♀. Pulvillus present. First protarsal segment with external spines not prolonged, the row doubled or trebled at base. Spines of comb of midtarsus little prolonged. Abdominal sternites unicolorous, the apices being barely paler than the rest of the segments. Upper and under surfaces of legs not contrasting strongly, the under being nearly as pale as the upper. Mesothoracic tegula without white upper fringe.

♂. Harpe stronger curved than in *euphorbiae*, similar to that of *gallii*.

Larva: head and pronotum of the pale colour of the other segments; two dorsal series of large black patches (also on head), a round yellow or red spot in these patches, spot at base of horn elongate; a series of ventro-lateral patches including similar yellow or red spots and extending on the under surface; horn black.—Food-plant: *Euphorbia*.

Hab. Mediterranean district, eastwards to Transcaspia and North West India.

Three subspecies:

a. C. nicaea nicaea.

Sphinx nicaea Prunner, *l.c.*; Hübner, *Samml. Eur. Schm., Sphing.* f. 149. 150 (180–?); God., *Lép. France* iii. p. 171. t. 17. f. 1 (1823); Meig., *Syst. Beschr. Schm.* ii. p. 139. n. 8 (1830).

Sphinx cyparissiae Hübner, *Samml. Eur. Schm., Sphing.* f. 115 (180–?); id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. *Leg.* B. e. f. 1. a. b. c (180-?).

Deilephila nicaea, Ochsenheimer, *Schm. Eur.* iv. p. 43. n. 8. p. 178. n. 8 (1816); Frey., *N. Beytr.* ii. p. 143. n. 120. t. 92. 93 (1829); Boisd., *Ind. Meth.* p. 33 (1829); Boisd., Grasl. & Ramb., *Icon. Chenill., Sphing.* t. 1. f. 3. 4 (1832); Cant., in Silberm. *Rev. Ent.* i. p. 77 (1833) (Dept. Var, vi. viii., = *cyparissiae*); Trcit., in Ochs., *Schm. Eur.* x. 1. p. 130 (1834); Dup., *Icon. Chenill.* t. 9. f. 1. a—d (1832–42); Herr.-Sch., *Eur. Schm.* ii. p. 88. n. 20 (1845); Luc., in Chenu, *Enc. Hist. Nat., Pap.* i. p. 258. fig. 457. 458. 459 (1853); Walk., *List Lep. Ins. B. M.* viii. p. 168. n. 7 (1856); Boisd., *Spec. Gén. Lép. Hét.* i. p. 164. n. 6 (1875); Luc., *Bull. Soc. Ent. France*

p. 173 (1875) (Crimea); Butl., *Trans. Zool. Soc. Lond.* ix. p. 570. n. 17 (1877); Weism., ed. Meld., *Stud. Theor. Desc.* i. p 207. t. 6. f. 51 (1882) (larvae); Rom., *Mém. Lép.* i. p. 70 (1884) (Erivan, 1 specim.); Kirby, *Cat. Lep. Het.* i. p. 667. n. 19 (1892); Hofm., *Raup. Grossschm.* p. 29. t. 7 f. 7 (1893); id., *Grossschm.* p. 30. n. 6. t. 17. f. 6 (1894); Bartel, in Rühl, *Grossschm.* ii. p. 90 (1899); Staud. & Reb., *Cat. Lep.* ed. iii. p. 103. n. 750 (1901) (Gal. m.; It. s. oc.; Crim.; ? Ili).

Hyles nivea (!), Hübner, *Verz. bek. Schm.* p. 137. n. 1474 (1822).

Deilephila nicea (!), Lucas, *Lép. Eur.* ed. ii. p. 138. t. 45. f. 1a (1864).

♂♀. Pale median area of forewing above more or less speckled with brown scales; marginal area less pale than median area.

Hab. South France; Spain; Italy; Greece; Crimea; Caucasia; Transcaspia.

In the Tring Museum 2 larvae, 9 ♂♂, 8 ♀♀ from South France, and a pair from Askhabad, one of these latter specimens agreeing with the following subspecies.

b. C. nicaea castissima.

Deilephila nicaea, Oberthür, *Et. Ent.* vi. p. 63. t. 3. f. 9. 9a (1881) (Sebdou; larva var.).

**Deilephila nicaea* var. *castissima* Austaut, *Le Nat.* v. p. 360 (1883) (Mus. Tring); id., *l.c.* viii. p. 260 (1886); id., *l.c.* xi. p. 232 (1889); Kirby, *Cat. Lep. Het.* i. p. 667. sub n. 19 (1892); Bartel, in Rühl, *Grossschm.* ii. p. 92 (1899); Staud. & Reb., *Cat. Lep.* ed. iii. p. 103. n. 750. a (1901) (Maur. oc.).

**Deilephila nicaea* var. *castissima* ab. *carnea* Austaut, *l.c.* xi. p. 232 (1889) (Mus. Tring); Bartel, *l.c.* (1899).

Deilephila nicaea var. *carnea* "Mab.," Kirby, *l.c.*

♂♀. Paler and often more pinkish than the preceding, with no or few speckles on the pale middle area of the forewing; distal marginal area of forewing as pale or nearly as pale as middle area.

Hab. Morocco; Algiers.

In the Tring Museum 3 ♂♂, 5 ♀♀ from Morocco and Algiers, including specimens of *castissima* and *carnea* from Austaut's collection, labelled "type."

c. C. nicaea lathyrus.

**Deilephila lathyrus* Walker, *List Lep. Ins. B. M.* viii. p. 172. n. 16 (1856) (N. India;—Mus. Brit.); Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 274. n. 632 (1857) (N. India); Boisd., *Spec. Gén. Lép. Hét.* i. p. 165. n. 7. t. 6. f. 2 (1875); Butl., *Trans. Zool. Soc. Lond.* ix. p. 570. n. 16 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 21. n. 110 (1887).

Dilephila euphorbiae, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 98. n. 154 (1892) (partim; N.W. Himalayas to Naini Tal).

Deilephila euphorbiae var. *lathyrus*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 103. n. 749. f. (1901) (partim).

♂♀. This form has nothing to do with *euphorbiae*, but is the N.W. Indian representative of *nicaea*, from which it differs in being more densely speckled with brown on the forewing, in having on the hindwing a broader black postdiscal band and a paler red discal one, and in being smaller.

Hab. N.W. India; doubtless occurring farther north-west.

Two ♂♂ from Kumaon in the Tring Museum.

680. Celerio zygophylli.

Sphinx zygophylli Ochsenheimer, *Schm. Eur.* ii. p. 226. n. 5 (1808) (S. Russia); Hübn., *Samml. Eur. Schm., Sphing.* t. 27. f. 125 (180-?); Bieb., *Bull. Moscou* ii. p. 4. t. 2 (1809).

Celerio zygophilli, Oken, *Lehrb. Naturg.* iii. 1. p. 761. sub n. 2 (1815).

Deilephila zygophylli, Ochsenheimer, *Schm. Eur.* iv. p. 43. n. 10, p. 181. n. 10 (1816); Boisd., *Icon. Hist. Lép.* ii. p. 32. n. 8. t. 51. f. 2 (1834) (S. Russia); Treit., in Ochs., *Schm. Eur.* x. p. 132

(1834) ; Dup., in God., *Lép. France, Suppl.* ii. p. 20. t. 3. f. 1 (1835) ; Eversm., *Fauna Volgo-Ural.* p. 110 (1844) ; Herr.-Sch., *Eur. Schm.* ii. p. 87. n. 17 (1847) ; Walk., *List Lep. Ins. B. M.* viii. p. 168. n. 9 (1856) ; Christ., *Stett. Ent. Zeit.* xxxiii. p. 216 (1872) (Derbent) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 168. n. 10 (1875) ; Weism., *Stud. Desc.* ii. p. 34. t. 3. f. 50 (1876) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 570. n. 14 (1877) ; Kirby, *Trans. Ent. Soc. Lond.* p. 236 (1877) (S. Russia) ; Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 217. t. 6. f. 50 (1882) (larva) ; Rom., *Mém. Lép.* i. p. 70 (1884) (Derbent ; Ordubad ; Tiflis ; Eldar ; Djielfi ; iv.—ix.) ; Alph.. in Rom., *ibid.* v. p. 83. n. 20 (1889) (Lob Nor, var.) ; Grum-Grsch., in Rom., *ibid.* iv. p. 511. n. 203 (1890) (Ferghana) ; Kirby, *Cat. Lep. Het.* i. p. 665. n. 8 (1892) ; Hofm., *Raup. Grossschm.* p. 285. t. 48. f. 9 (1893) ; Teich, *Stett. Ent. Zeit.* lvii. p. 30 (1896) (Araxes, larva common) ; Bartel, in Rühl, *Grossschm.* ii. p. 69 (1899) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 102. n. 744 (1901).

Deilephila zygophylli (!), Hofmann, *Grossschm.* p. 29. n. 3. t. 17. f. 3 (1894).

♂♀. First protarsal segment with few and long external spines. Pulvillus vestigial. Mesothoracic tegula mostly with white fringe above, but not always. Abdominal sternites without distinctly white edges. White discal band of forewing restricted, the cinnamon-clay-coloured costal area more extended than in *euphorbiae*, patch beyond end of cell merged together with this area, less rounded than in *euphorbiae*.

♂. Process of harpe relatively long, curved at end.

Larva variable, green, grey, or brown, dotted with white, a black dorsal line, a white dorso-lateral one which shows sometimes vestiges of the round spots of other species ; horn black.—Food-plant : *Zygophyllum*.

Hab. South Russia eastwards to the Lob-Nor.

In the Tring Museum 13 ♂♂, 9 ♀♀ from : Astrachan ; Ordubad ; Merw ; Ruschke, Afghanistan.

681. Celerio vespertilio.

Ernst & Engr., *Pap. Eur.* iii. p. 98. t. 111. f. 159 (1782).

Sphinx vespertilio Esper, *Schmett.* ii. p. 178. n. 28. t. 22. f. 4 (1779) (Verona) ; Fuessly, *Arch. Ins.* t. 2. f. 1. 2 (1781) ; Fabr., *Spec. Ins.* ii. p. 504 (1781) ; id., *Mant. Ins.* ii. p. 96. n. 38 (1787) ; Borkh., *Eur. Schm.* ii. p. 87. n. 4, p. 142. n. 9, p. 179. n. 9 (1789) ; Vill., *Ent. Linn.* ii. p. 97. n. 17. t. 4. f. 17 (1789) ; Gmel., *Syst. Nat.* i. 5. p. 2384. n. 84 (1790) ; Rossi, *Fauna Etr.* ii. p. 160. n. 1049 (1790) ; Fabr., *Ent. Syst.* iii. i. p. 369. n. 40 (1793) ; Prunn., *Lep. Pedem.* p. 87. n. 175 (1798) ; Hübn., *Samml. Eur. Schm., Sphing.* p. 97. n. 9. t. 11. f. 62, t. 21. f. 103. 104 (180—?) ; id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. *Leg.* B. b. f. 1. a. b (180—?) ; Ochs., *Schm. Eur.* ii. p. 228. n. 6 (1808) ; Latr., in *N. Dict. Hist. Nat.* xxii. p. 27 (1819) ; God., *Lép. France* iii. p. 178. t. 17. f. 2 (1823) ; Frey., *N. Beitr. Schm.* i. p. 73. t. 39 (1829) ; Meig., *Handb. Schm.* p. 97. n. 12 (1827) ; id., *Syst. Beschr. Schm.* p. 142. n. 12. t. 66. f. 1 (1830) ; Luc., *Lép. Eur.* p. 113. t. 43 (1834)

Celerio vespertilio, Oken, *Lehrb. Naturg.* iii. 1. p. 761, sub n. 2 (1815).

Deilephila vespertilio, Ochsenheimer, *Schm. Eur.* iv. p. 43. n. 11 (1816) ; Boisd., Ramb. & Grasl., *Hist. Icon. Chenill., Sphing.* t. 6. f. 4. 5 (1832) ; Cant., in Silberm., *Rev. Ent.* i. p. 77 (1833) (Dept. Var, vi.) ; Boisd., *Hist. Icon. Lép.* ii. p. 22. n. 3. t. 49. f. 3 (1834) ; Treit., in Ochs., *Schm. Eur.* x. p. 135 (1834) ; Duponch., *Icon. Chenill.* i. *texte.* t. 3. f. 2 a—d (1832—42) ; Herr.-Sch., *Schm. Eur.* ii. p. 89. n. 24 (1847) ; Mill., *Bull. Soc. Ent. France* p. 14 (1852) (Ichneum.) ; Walk., *List Lep. Ins. B. M.* viii. p. 170. n. 10 (1856) ; Luc., in Chenu, *Enc. Hist. Nat., Pap.* i. p. 260. fig. 460 (1853) ; Wilde, *Raup.* ii. p. 84 (1860) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 174. n. 17 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 571. n. 22 (1877) ; Staud., *Hor. Soc. Ent. Ross.* xiv p. 296 (1878) (Asia Min. ? ?) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 44 (1880) ; Rom., *Mém. Lép.* i. p. 70 (1884) (Borjoum ; Lagodekhi) ; Kill., *l.c.* xxix. p. 7 (1886) ; Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 209. t. 3. f. 13. 14. 15, t. 6. f. 49 (1882) (larvae) ; Kirby, *Cat. Lep. Het.* i. p. 667. n. 23 (1892) ; Hofm., *Raup. Grossschm.* p. 28. t. 7. f. 3 (1893) ; id., *Grossschm.* p. 29. n. 1. t. 17. f. 1a (1894) ; Kill. & Cafl., *Jahrb. Nat. Ges. Graub.* xxxviii. *App.* p. 19 (1895) ; Kirby, in Allen, *Nat. Libr., Moths* iv. p. 35. t. 102. f. 2 (1897) ; Bartel, in Rühl, *Grossschm.* ii. p. 58 (1899) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 101. n. 742 (1901) (Alp. val. ; Austr. ; Gal. m. mont. ; It. c. ; Arm.).

Thaumas vespertilio, Hübner, *Verz. bek. Schm.* p. 138. n. 1476 (1822).
Sphynx vespertilio, Vogel. *Schmett. Cab.* vii. p. 15. t. 7. f. 2 (1825).
Deilephila vespertilio var. *burckhardti* Mory, *Mitth. Schw. Ent. Ges.* x. p. 349. t. 1 (1901).

♂ ♀. The uniformly brownish forewing, which shows only a vestige of the discal line, distinguishes this species from all the others. External spines of first protarsal segment not much prolonged, the row complete, double at base. Pulvillus vestigial.

♂. The thin part of the harpe short, little curved.

Larva, adult, without horn, dorso-lateral spots not quite round, last one elongate; back with a network of thin brown lines somewhat resembling the minute pattern of the back of *elpenor*.—Food-plant: *Epilobium*.

Pupa longer and slenderer than in *gallii* and *euphorbiae*.

The following forms are doubtless hybrids between *vespertilio* on one side and *euphorbiae* and *hippophaes* on the other. As the hybrids have not yet been reared in confinement we do not know which species served as ♂ and which as ♀. The larvae of these supposed hybrids live on *Epilobium*, that of hybr. *amelia* also on *Hippophaë*. Of the four possible combinations two only seem to be known; but the hybr. *amelia* may be the offspring of a different combination from that of *vespertilioides*, in one case *vespertilio* serving perhaps as ♂, in the other as ♀.

a. hybr. *hippophaës* × *vespertilio*, or *vespertilio* × *hippophaës*.

Sphinx amelia Feisthamel, *Bull. Sc. Nat.* ii. p. 162 (1827); Boisd., *Ind. Meth* p. 33 (1829) (= *vespertilioides*).
Deilephila amelia, Duponchel, in God., *Lép. France, Suppl.* ii. p. 11. t. 1. f. 2 (1835).
**Sphinx vespertilioides* Boisduval, *Ann. Soc. Linn. Paris* vi. p. 114. t. 6. f. 4 (1827); id., *Ind. Meth.* p. 33 (1829) (= *amelia* ;—coll. Charles Oberthür); Boisd., Ramb. & Grasl., *Icon. Hist. Chenill., Sphing.* t. 9. f. 1 (1832); Ramb., *Ann. Soc. Ent. France* p. 426 (1832) (= hybr. *vespertilio* × *hippophaës*); Treit., in Ochs., *Schm. Eur.* x. 1. p. 135 (1834); Herr.-Sch., *ibid.* ii. p. 89. n. 23. f. 10. 13 (1847); Walk., *List Lep. Ins. B. M.* viii. p. 170. n. 12 (1856); Boisd., *Spec. Gén. Lép. Hét.* i. p. 175. n. 18 (1875); Hofm., *Raup. Grossschm.* p. 284 (1893); id., *Grossschm.* p. 29 (1894).
Deilephila vespertilio hibr. *vespertilioides*, Staudinger & Wocke, *Cat. Lep.* ed. ii. p. 36. n. 461. a (1871); Bartel, in Rühl, *Grossschm.* ii. p. 61 (1899) (Grenoble; Isère).

b. hybr. vespertilio × *euphorbiae*, or *euphorbiae* × *vespertilio*.

**Sphinx epilobii* Boisduval, Ramb. & Grasl., *Icon. Hist. Chenill., Sphing.* t. 9 f. 2 (1832) (coll. Charles Oberthür).
Deilephila epilobii Rambur, *Ann. Soc. Ent. France* p. 426 (1832) (= hybr. *vespertilio* × *euphorbiae*); Boisd., *Icon. Lép.* ii. p. 24. n. 4. t. 51. f. 3 (1834) (Lyon); Herr.-Sch., *Schm. Eur.* ii. p. 89. n. 21. f. 9 (1847); Walk., *List Lep. Ins. B. M.* viii. p. 170. n. 11 (1856); Boisd., *Spec. Gén. Lép. Hét.* i. p. 177. n. 19 (1875); Rou. & Reyn., *Bull. Soc. Ent. France* p. 84 (1877) (Lyon, viii.); Hofm., *Raup. Grossschm.* p. 285. t. 48. f. 11 (1893); id., *Grossschm.* p. 29. t. 27. f. 1. b (1894); Standf., *Handb. Schm.* p. 54 (1896); Schlumb., *Mitth. Münch Ent. Ver.* xii. p. 1 (1897); id., *l.c.* xiii. p. 2 (1898).
Deilephila vespertilio hibr. *epilobii*, Staudinger & Wocke, *Cat. Lep.* ed. ii. p. 36. n. 461. b (1871); Bartel, in Rühl., *Grossschm.* ii. p. 63 (1899) (Elsass; Basel; Wallis; Bozen; Wien; Lyon).

Hab. South France northward to Baden, eastward to Caucasia and Armenia, not recorded from Spain and North Africa.

In the Tring Museum 3 larvae, 1 pupa, 80-odd specimens.

682. Celerio hippophaës.

Sphinx hippophaës Esper, *Schmett.* ii. *Suppl.* 2. p. 6. n. 65. t. 38. f. 1—3 (1789) (Wallachei).

♂ ♀. Pulvillus vestigial. First protarsal segment with few spines externally, but most of these spines prolonged. Abdominal segments without white fringes.

Inner edge of brown band of forewing straight, at least less bent behind than in the forms of *euphorbiae* ; pale discal area gradually shading off into the darker costal area, no costal patch beyond apex of cell, or this patch rather small, separate from costal margin. Mesothoracic tegula not fringed white above.

♂. Sexual armature not obviously different from that of *respertilio*.

Larva without ocelli, there being one large elongate spot at the base of the rather thin horn, the round spots of the other species represented by a pale dorso-lateral line : below stigmata a broad white continuous band.—Food-plant : *Hippophaë*.

Pupa slender, as in *respertilio*, the head-case slightly broader.

Hab. From Spain northward to Baden, eastward to Central Asia.

Two subspecies :

a. C. hippophaës hippophaës.

Sphinx hippophaës Esper, *l.c.* ; Hübn., *Samml. Eur. Schm., Sphing.* p. 97. n. 8. t. 22. f. 109 (180-?) ; id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. *Leg.* B. b. c. f. 1. a—c (180-?) ; God., *Lép. France* iii. p. 173. t. 17bis (1823) ; Lucas, *Lép. Eur.* p. 113. t. 43 (1834).

Sphinx hippophaees (!), Ochsenheimer, *Schm. Eur.* ii. p. 221. n. 3 (1808).

Deilephila hippophaës, id., *l.c.* iv. p. 43. n. 7, p. 178. n. 7 (1816) : Frey., *Beytr.* i. p. 65. 66. t. 20 (1828) ; Meig., *Syst. Beschr. Schm.* p. 140. n. 10. t. 65. f. 4 (1830) ; Boisd., Ramb. & Grasl., *Hist. Icon. Chenill., Sphing* t. 9 (1832) ; Treit., in Ochs., *Schm. Eur.* x. p. 130 (1834) ; Dup., *Icon. Chenill.* i. *texte* t. 4. f. 2. a. b (1832—42) ; Herr.-Sch., *Eur. Schm.* ii. p. 89. n. 22 (1847) ; Walk., *List Lep. Ins. B. M.* viii. p. 169. n. 9 (1856) ("Corsica, Sardinia" ad *C. euph. dahli* dict. refer.) ; Luc. *Lép. Eur.* ed. ii. p. 138. t. 43. f. 1 (1864) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 159. n. 1 (1875) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 571. n. 21 (1877) ; Kirby, *Trans. Ent. Soc. Lond.* p. 236 (1877) (= *amelia*) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 44 (1880) ; Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 218. t. 6. f. 58. t. 7. f. 59. 60. 61 (1882) (larva) ; Rom., *Mém. Lép.* i. p. 70 (1884) (Tiflis ; Derbent) ; Kirby, *Cat. Lep. Het.* i. p. 667. n. 22 (1892) (syn. partim) ; Hofm., *Raup. Grossschm.* p. 28. t. 7. f. 4 (1893) ; id., *Grossschm.* p. 29. n. 2. t. 17. f. 2 (1894) ; Bartel, in Rühl, *ibid.* ii. p. 65 (1899) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 102. n. 743 (1901).

Hylas hippophaës, Hübner, *Verz. bek. Schm.* p. 137. n. 1473 (1822).

Sphinx hippophaees (!), Vogel, *Schmett. Cab.* x. p. 9. t. 5. f. 1 (1829) (larva).

Dilephila hippophaes, Kirby, in Allen, *Nat. Libr., Moths* iv. p. 34. t. 102. f. 3 (1897).

♂ ♀. *Upperside* of body and band of forewing blackish olive ; underside also much shaded with olive.

Hab. Spain to the Caucasus.

In the Tring Museum 2 larvae, 1 pupa, 25 specimens from Switzerland.

We have not seen Caucasian examples.

b. C. hippophaës bienerti.

Deilephila hippophaës, Bienert, *Lep. Erg. Reise Persien* p. 32 (1869).

Deilephila spec., Christoph, *Hor. Soc. Ent. Ross.* x. p. 31 (1873) (Shahrud).

Deilephila bienerti Standinger, *Stett. Ent. Zeit.* xxxv. p. 91 (1874) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 571. n. 20 (1877) ; Aust., *Le Nat.* viii. p. 260 (1886) ; Alph., in Rom., *Mém. Lép.* v. p. 83. n. 21 (1889) (Lob Nor) ; Kirby, *Cat. Lep. Het.* i. p. 667. n. 21 (1892) ; Bartel, in Rühl, *Grossschm.* ii. p. 67 (1899).

Deilephila insidiosa Erschoff, in Fedsch., *Reise Turkest., Lep.* p. 25 (1874) ; Kirby, *Ent. Mo. Mag.* xxv. p. 361 (1889) ; Grum-Grsch., in Rom., *Mém. Lép.* iv. p. 510. n. 202 (1890) (Ferghana ; = *bienerti*).

Deilephila hippophaës var. *bienerti*, Standinger & Rebel, *Cat. Lep.* ed. iii. p. 102. n. 743. a (1901).

♂ ♀. Much paler than the preceding form, clayish, underside almost cream-colour ; the patch beyond end of cell of forewing absent or vestigial.

A ♂ from Merw in the Tring Museum paler than the other individuals.

Hab. Transcaspia, eastwards to the Issyk-kul; North Persia; ? Naryn, S. Russia.

In the Tring Museum 6 ♂♂, 5 ♀♀ from: Margelan; Merw.

683. Celerio lineata.

Sphinx vitis, Houttuyn (*non* Linné, 1758), *Naturl. Hist.* i. 11. p. 434. n 14. t. 90. f. 4 (1767) (partim).
Sphinx lineata Fabricius, *Syst. Ent.* p. 541. n. 18 (1775) (America); id. *Mant. Ins.* ii. p. 96. n. 37 (1787); id. *Spec. Ins.* ii. p. 147. n. 34 (1781); Gmel., *Syst. Nat.* i. 5. p. 2383. n. 83 (1790); Fabr., *Ent. Syst.* iii. 1. p. 368. n. 39 (1793).
Deilephila lineata, Ochsenheimer, *Schm. Eur.* iv. p. 42. n. 5 (1816).
Phryxus livornica, Hübner, *Verz. bek. Schm.* p. 137. n. 1468 (1822).
Deilephila livornica Bartel, in Rübl, *Grossschm.* ii. p. 98 (1900).

♂♀. Pulvillus present, smaller in the American subspecies than in the two of the Eastern Hemisphere. Outer spines of foretarsus prolonged, at least partly, their number often obviously reduced. Mesothoracic tegula with white upper fringe. Abdomen with a double series of black dorsal dots. Veins of forewing above pale from cell to marginal band. End of abdomen see Pl. LXIII. f. 3, and mouth-parts Pl. LXII. f. 2.

Sexual armature of the ordinary type; process of harpe comparatively short, acute, curved.

Larva very variable; green to black; a dorsal line, a dorso-lateral one traversing the eye-spots and a line below the stigmata; these lines sometimes absent; eye-spots often vestigial.—Food-plants: *Galium*; *Vitis*; *Rumex*; *Oenothera*; *Portulaca*; *Prunus*; etc., etc.

Pupa long; tongue-case enlarged basally, two frontal tubercles above at its base.

Hab. America; Africa; South Europe, eastwards to China and South India; Australia.

The distribution is very remarkable, inasmuch as the species does not occur in the countries between North India and Australia, while it reappears in the latter.

Three sharply defined subspecies:

a. C. lineata lineata.

Sphinx vitis, Houttuyn (*non* Linné, 1758), *Naturl. Hist.* i. 11. p. 438. n. 14. t. 90. f. 4 (1767) (partim); Müll., *Naturs.* v. 1. p. 640. n. 16. t. 20. f. 4 (1774) (partim).
Sphinx lineata Fabricius, *Syst. Ent.* p. 541. n. 18 (1775); Gocze, *Ent. Beytr.* iii. 2. p. 206. n. 11 (1780); Abb. & Smith, *Ins. Georgia* i. p. 77. t. 39 (1797); Don., *Brit. Ins.* vi. p. 59. t. 204. f. 1 (1797).
Sphinx daucus Cramer, *Pap. Exot.* ii. p. 41. t. 125. f. D (1777); Gocze, *Ent. Beytr.* iii. 2. p. 223. n. 69 (1780); Lep. & Serv., *Enc. Méth.* x. p. 465. t. 66. f. 5 (1825).
Deilephila lineata, Ochsenheimer, *Schm. Eur.* iv. p. 42. n. 5 (1816) (partim); Steph., *Cat. Brit. Ins.* ii. p. 33 (1829); Harris, in Sillim., *Journ. Sc. Art* xxxvi. p. 304. n. 1 (1839); Clem., *Journ. Ac. N. Sc. Philad.* iv. p. 143. n. 22 (1859); Morris, *Cat. Lep. N. Am.* p. 20 (1860); Clem., in Morris, *Syn. Lep. N. Am.* p. 164. n. 1 (1862); Harris, ed. Flint, *Ins. Inj. Veget.* p. 328 (1863); Lintn., *Proc. Ent. Soc. Philad.* iii. p. 662 (1864) (life hist.); Grote, *Proc. Ent. Soc. Philad.* v. p. 58 (1865); id. & Rob., *ibid.* v. p. 156. n. 49 (1865); Grote, *l.c.* vi. p. 328 (1867); Riley, *Ent. Amer.* ii. p. 257. fig. 162—164 (1870); Dimm. & Mann, *Psyche* ii. p. 67 (1871) (liter. rel. to metam.); Riley, *Rept. Missouri* iii. p. 141 fig. (1871); Lintn., *Ent. Contr.* i. p. 192 (1872); id., *l.c.* ii. p. 179 (1873); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 21 (1874); id., *l.c.* ii. p. 225. n. 25 (1875); Thaxt., *Psyche* i. p. 29 (1874) (Newton, Mass., vi. ix.); Saund., *Rept. Ent. Soc. Ontar.* iv. p. 28 fig. (1874); Riley, *Rept. Missouri* viii. p. 122. fig. 42—44 (1876); Saund., *l.c.* vi. p. 37. fig. (1876); Butl., *Trans. Zool. Soc. Lond.* ix. p. 568. n. 2 (1877); Dew., *Mitth. Munch. Ent. Ver.* i. p. 92

(1877) (Porto Rico) ; Grote, *l.c.* iii. p. 222. n. 27 (1877) ; Saund., *Canad. Ent.* ix. p. 64. fig. 3. 5 (1877) ; Butl., *Proc. Zool. Soc. Lond.* p. 483. n. 52 (1878) (Jamaica) ; Mart., *Trans. Dept. Agric. Illin.* xvi i. *App.* p. 100. fig. (1880) ; Butl., *Papilio* i. p. 104 (1881) ; Gundl., *Contr. Ent. Cubana* p. 196 (1881) ; Pil., *Papilio* ii. p. 66 (1882) ; Reed, *Rept. Ent. Soc. Ontar.* xii. p. 55. fig. (1882) ; Saund., *Ins. Inj. Fruits* p. 254. n. 136. fig. 264—266 (1883) ; Fern., *Canad. Ent.* xvi. p. 21 (1884) (Maine, ix.) ; Bowl., *ibid.* p. 39 (1884) (Montreal) ; Lintn., *Papilio* iv. p. 145 (1884) (R. Grande) ; Feru., *Sphing. N. Engld.* p. 56. n. 25. t. 2. f. 2. 3. 4 (1886) ; Grote, *Canad. Ent.* xviii. p. 132. n. 35 (1886) ; id., *Hawk Moths N. Am.* p. 31 (1886) ; Hulst, *Ent. Amer.* iii. p. 219 (1888) (larvae gathered for food by Indians) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 133. t. 5. f. 9 (genit.) (1888) ; Edw., *Bull. U. St. N. Mus.* xxxv. p. 40 (1889) (liter. rel. to metam.) ; Dyar, in Riley, *Ins. Life* iii. p. 322 (1891) (N.Y., at electr. light) ; Kirby, *Cat. Lep. Het.* i. p. 664. n. 2 (1892) ; Alb., *Ent. News* vi. p. 145 (1895) (Los Angeles) ; Beutenm., *Bull. Amer. Mus. N. Sc.* vii. p. 285. t. 3. f. 2 (1895) ; Cross, *Ent. News*, vii. p. 297 (1896) (N. Hampshire) ; Soule, *Psyche* vii. p. 458 (1896) (Iowa, life hist.) ; Peale, *Ent. News* viii. p. 49. plate (1897) (life hist.) ; Hanh., *Canad. Ent.* xxix. p. 292 (1897) (Manitoba) ; Grant, *Canad. Ent.* xxx. p. 264 (1898) (Orillia, Ontar, 20. ix.) ; Brown., *Ent. News* x. p. 46 (1899) (huge numbers of larvae wandering ; Utah) ; Rowl., *Ent. News* x. p. 11 (1899) (Missouri).

Deilephila daucus, Stephens, *Illustr. Brit. Ent., Haust.* i. p. 126 (1829) ; Wood, ed. Westw., *Ind. Ent.* p. 246 t. 53 f. 27 (1854) ; Walk., *List Lep. Ins. B. M.* viii. p. 171. n. 13 (1856) ; Lucas, in Sagra, *Hist. Cuba* vii. p. 295 (1857) ; Boisd., *Ann. Soc. Ent. Belg.* xii. p. 65. n. 68 (1868) ; Herr.-Sch., *Corresp. Bl.* iii. p. 58 (1865) (Cuba) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 173 n. 16 (1875) ; Edw., *Proc. Calif. Ac. Sc.* vi. p. 91 (1875) (food-plants : *Rumex* ; *Epilob.* ; *Polygon.*) ; id., *l.c.* vii. p. 20 (1877) ; Burm., *Descr. Rép. Argentin.* v. p. 338 n. 2 (1878) ; id., *l.c. Atlas* p. 38. t. 16. f. 4 (1879).

Deilephila lineata var *daucus*, Behr, *Papilio* ii. p. 2 (1882) (Calif. ; larva ; common).

Deilephila lineavis (!), Lucas, *Proc. Roy. Soc. Queensld.* viii. p. 73 (1891).

♂ ♀. Pulvillus smaller than in the other two subspecies. First protarsal segment with some additional spines at the base above the first row. Mesothoracic tegula with white middle stripe. Abdominal tergite without white spots laterally of the double row of black dorsal dots, and with five black side-patches which gradually diminish in size ; a white spot in front of the black side-spots. Scaling of antenna brown, tip always white, often the white colour more extended.

Caterpillar on the whole much less densely chequered with yellow and black than in the Old-World *lin. livornica*.

Hab. America, from Canada to Argentina, but not found in Brazil, though it occurs east of the La Plata.

In the Tring Museum 13 larvae, 12 pupae, 140-odd specimens from : Canada ; British Columbia ; various places of the U.S. ; Cuba ; Haiti ; Jamaica ; Galapagos ; Colombia ; Mexico ; Venezuela ; La Soledad, Argentina, near border of Urugnay.

b. C. lineata livornica.

Ernst & Engr., *Pap. Eur.* iii. p. 96. t. 110. f. 158. a. b. c., t. 111. f. 158. d. e. (1782).

Sphinx livornica Esper, *Schmett.* ii. p. 88 (1779) ; id., p. 196. n. 37 (1779) ; id., *l.c. Suppl.* ii. p. 41. t. 46. f. 3—7 (1806) (larva ; syn. partim) ; Hübn., *Samml. Eur. Schm., Sphing.* p. 96. n. 5. fig. 65. 112 (180— ?) ; id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. Leg. B. c. f. a. b. c. (180— ?) ; Luc., *Lép. Eur.* p. 112. t. 42 (1834) ; Eversm., *Fauna Volgo-Ural.* p. 110 (1844) (v.).

Sphinx celerio var., Esper, *l.c.* t. 8. f. 4. (1779).

Phinx (!) *koechlini* Fuessly, *Arch.* i. p. 1. t. 4. f. 1—4 (*l., p., i.*) (1781) (Mühlhausen).

Sphinx koechlini id., *l.c.* vi. p. 15. t. 33. f. 1—5 (*l., p.*) (1785) ; id., *N. Mag. Ent.* ii. p. 371 (1785) ; Lang, *Verz. Augsb.* ed. ii. p. 69. n. 566 (1789) ; Borkh., *Eur. Schm.* ii. p. 83, p. 141, p. 179. n. 3 (1789) ; Schwarz, *Raupenkal.* p. 204. n. 364 (1791) ; Schrank, *Fauna Boica* ii. 1. p. 225. n. 1388 (1801).

Sphinx lineata Fabricius, *Mant. Ins.* ii. p. 96. n. 37 (1787) (partim) ; Vill., *Ent.* iv. p. 440 (1789) (= *koechlini*) ; Rossi, *Fauna Etr.* ii. p. 14. n. 359 (1794) ; Ochs., *Schm. Eur.* ii. p. 214. n. 1. (1806) (partim) ; Sam., *Ent. Comp.* p. 243 (1819) (fig. of Donov. distinct, not Brit. ?) ; God., *Lép. France* iii. p. 40. t. 18. f. 1 (1823) ; Lep. & Serv., *Enc. Méth.* x. p. 465. t. 66. f. 5 (1825) ; Meig.,

Handb. Schm. p. 95. n. 9. t. 10. f. 2 (1827); id., *Syst. Beschr. Schm.* ii. p. 153. n. 5. t. 64. f. 5 (1830); Friv., in Silberm., *Rev. Ent.* ii. p. 181 (1834) (Hungary); Ramb., *Faune Andalouse.* p. 333 (1842); Treit., *Hülfsb. Schm.* p. 166. n. 9 (1844); Herr.-Sch., *Eur. Schm.* ii. p. 88. n. 44 (1847).

Deilephila lineata, Ochsenheimer, *Schm. Eur.* iv. p. 43. n. 5 (1816); Steph., *Illustr. Brit. Ent., Haust.* i. p. 126. n. 3. t. 12. f. 1 (1829); Boisd., Ramb. & Grasl., *Hist. Icon. Chenill.* t. 5. f. 3. 4, t. 111 (1832); Cant., in Silberm., *Rev. Ent.* i. p. 77 (1833) (Dépt. Var, vi. vii.); Treit., in Ochs., *Schm. Eur.* x. p. 129 (1834); Dunc., in Jard., *Nat. Libr.* xl. p. 152 (1843); Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847); Lucas, *Bull. Soc. Ent. France* p. 109 (1847) (Djebel-Amur); id., *Explr. Sc. Algérie, Art.* iii. p. 371. n. 67 (1849); Wilde, *Raup.* ii. p. 83. n. 11 (1860); Lucas, *Lép. Eur.* ed. ii. p. 139. t. 42. f. 3. (1864); All., *Ann. Soc. Ent. France* p. 315 (1867) (Biskra); Mab., *ibid.* p. 638 (1867) (Corsica); Oberth., *Et. Ent.* i. p. 32 (1876) (Algiers); Boisd., *Spec. Gén. Lép. Hét.* i. p. 172. n. 15 (1875); Lucas, *Bull. Soc. Ent. France* p. 68 (1879); Mab., *Ann. Soc. Ent. France* p. 296 (1879) (Madagascar).

Phryxus livornica, Hübner, *Verz. bek. Schm.* p. 137. n. 1468 (1822).

Sphynx kocchlini, Vogel, *Schmett. Cab.* vii. p. 13. t. 7. f. 1. a. b (1825).

Celerio lineata, Oken, *Lehrb. Naturg.* iii. 1. p. 761. sub n. 1 (1815) (= *kocchlini* = *livornica*).

Deilephila livornica, Stephens, *Cat. Brit. Ins.* ii. p. 32 (1829); Westw. & Humphr., *Brit. Moths* p. 19 t. 4. f. 7. 8. 9 (1843); Walk., *List Lep. Ins. B. M.* viii. p. 164. n. 1 (1856); Mann, *Wien. Ent. Mon.* iii. p. 32 (1859) (Sicily); id., *l.c.* vi. p. 66 (1862) (Brussa); Led, *ibid.* vii. p. 22 (1863) (Bulg.; Rumel.); id., *Ann. Soc. Ent. Belg.* xiii. p. 28 (1869) (Elbrus, 12,000 ft.); Bien., *Lep. Erg. Reise Persien* p. 33 (1869) (Alburs, iv.); Bign., *Entom.* v. p. 169. 180. 214 (1870) (life hist.); Hell., *Ent. Mo. Mag.* vii. p. 99 (1870); Staud. & Wocke, *Cat. Lep.* ed. ii. p. 37. n. 471 (1871); Christ., *Hor. Soc. Ent. Ross.* x. p. 31 (1873) (Shahrud; Hadschyadabad; common); Butl., *Trans. Zool. Soc. Lond.* ix. p. 568. n. 1 (1877); Staud., *Hor. Soc. Ent. Ross.* xiv. p. 297 (1878) (Amasia; Tokat); Kindb., *Ent. Tidskr.* i. p. 153 (1880) (Ostgotland); Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 45 (1880); Butl., *Proc. Zool. Soc. Lond.* p. 613 (1881) (Kurrachi, iii.); Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 215. t. 7. f. 62 (1882) (larvae); Albr., *Bull. Moscou* p. 379 (1882) (Moscow); Butl., *l.c.* p. 494. n. 46 (1884) (Aden); Rom., *Mém. Lép.* i. p. 71 (1884) (Tiflis; Borjoum; Derbent; iv.—viii.); Swinh., *Proc. Zool. Soc. Lond.* p. 513. n. 3 (1884) (Kurrachi, iii. iv.); Möschl. *Verh. Zool. Bot. Ges. Wien* xxxiii. p. 287. n. 78 (1884) (Caffraria); Lampa, *Ent. Tidskr.* vi. p. 27. n. 115 (1885); Swinh., *l.c.* p. 287. n. 6 (1885) (Bombay); id., *Trans. Ent. Soc. Lond.* p. 346. n. 2 (1885) (Quetta, vii.); Butl., *Proc. Zool. Soc. Lond.* p. 379. n. 95 (1886) (Campbellpore, v.); Swinh., *ibid.* p. 435. n. 9 (1886) (Mhow, vi.); Cot. & Swinh., *Cat. Moths Ind.* i. p. 20. n. 109 (1887); Kill. *Jahrb. Nat. Ges. Graub.* xxix. p. 7 (1886); Warr., *Proc. Zool. Soc. Lond.* p. 293. n. 5 (1888) (Campbellpore, v. vii.); Swinh., *Journ. Bombay N. H. Soc.* iii. p. 118. n. 10 (1888) (Karachi, iii. vi.—ix.); Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 23. n. 86 (1892); Kirby, *Cat. Lep. Het.* i. p. 664. n. 1 (1892); Hofm., *Raup. Grossschm.* p. 29. t. 7. f. 8 (1893); id., *Grossschm.* p. 30. t. 17. f. 8 (1894); Leech, *Proc. Ent. Soc. Lond.* p. 285 n. 57 (1898) (Wa-shan vii.); Nurse, *Journ. Bombay N. H. Soc.* xii. p. 513 (1899).

Sphinx livornica (!), Lalanne, *Man. Ent.* p. 115. n. 4 (date ?).

Deilephila liburnica (!), Weiler, *Progr. Oberrealsch. Innsbr.* p. 15 (1880).

Dilephila livornica, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 97. n. 153. fig. 55 (♂) (1892).

Deilephila lineata var. *livornica*, Standinger & Rebel, *Cat. Lep.* ed. iii. p. 103. n. 752. a (1901).

♂♀. Mesothoracical tegula without white middle stripe. First two black side-patches of abdomen large, the following represented by small dots; black dorsal dots accompanied laterally by white spots: no white spots at the base of segments 4 to 6 in front of the black dots, but fringe again white beneath the black side-spots; edges of sternites also obviously white; the abdomen thus appearing much more chequered than in *lineata lineata*. Antenna scaled brown, except at end. Indian and Chinese specimens are on the whole darker than African and Central Asiatic ones.

Hab. Africa, northward to Southern Europe, occasionally wandering to Central Europe, South Sweden, eastwards reaching into China and South India.

In the Tring Museum 4 larvae, 40-odd specimens from: China; Calcutta; Persia; Afghanistan; Transcaucasia; Natal; Morocco; Algiers; various places in Europe.

c. C. lineata livornicoides.

Deilephila livornica Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 119. n. 32 (1891) (partim ; Brisbane) ; id., *l.c.* p. 63 (1891) (Mackay) ; Lower, *Proc. Linn. Soc. N. S. W.* xxii. p. 32 (1897) ; id., *l.c.* xxiii. p. 54 (1898) (Adelaide ; Brisbane ; Mackay).

Deilephila livornicoides Lucas, *Proc. Roy. Soc. Queensld.* viii. p. 73 (1891) (Toowoomba ; Rockhampton).

♂♀. A small and pale form. Antenna wholly creamy white above. Abdomen with two black side-spots, no black side-dots on the following segments. First protarsal segment with four long spines, mostly without smaller spines between, second segment with one long spine at end and often a shorter one more basal.

Hab. Australia.

In the Tring Museum 14 ♂♂, 12 ♀♀ from : Dawson R., Queensland ; Roebourne, Derby, and Sherlock R., West Australia.

Apparently much rarer in N. S. Wales and Queensland than in West Australia.

684. Celerio calverleyi.

Deilephila calverleyi Grote, *Proc. Ent. Soc. Philad.* v. p. 56. t. 1 f. 4 (♂) (1865) (Cuba) ; Grote & Rob., *ibid.* v. p. 156. n. 48 (1865) ; Grote, *ibid.* vi. p. 328 (1867) ; id., *Trans. Amer. Ent. Soc.* iii. p. 184 (1871) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 569. n. 9 (1877) ; Gundl., *Contr. Ent. Cubana* p. 198 (1881) ; Kirby, *Cat. Lep. Het.* i. p. 665. n. 9 (1892).

♂. Thorax with white stripes as in *lineata*, forewing nearly as in *gallii*. Antenna pale. No dorsal markings on abdomen.

Hab. Cuba.

Not seen.

CLVI. PERGESA.—Typus : *porcellus*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Spectrum Scopoli, *Intr. Hist. Nat.* 414 (1777) (partim ; includes type of *Sphinx*).
Deilephila Laspeyres, *Jenaische Allg. Literatur-Zeit.* iv. p. 99 (1809) (partim ; type : *nerii*).
Elpenor Oken, *Lehrb. Naturg.* iii. 1. p. 760 (1815) (partim ; type : *nerii*).
Theretra Hübner, *Verz. bek. Schm.* p. 134 (1822) (partim ; type : *equestris* = *nessus*).
Oreus id., *l.c.* p. 136 (1822) (partim ; type : *gnoma* = *butus*).
Choerocampa Duponchel, in Godart, *Lép. France, Suppl.* ii. p. 159 (1835) (partim ; type : *nerii*).
Metopsilus Duncan, in Jardine, *Natural. Libr.* xl. p. 154 (1836) (partim ; type : *nerii*).
Chaerocampa (!), Walker, *List Lép. Ins. B. M.* viii. p. 125 (1856) (partim).
Pergesa id., *l.c.* viii. p. 149 (1858) (partim ; type : *porcellus*).
Smerinthus, Oberthür (*non* Latreille, 1802), *Et. Ent.* v. p. 25 (1881).
Cinogon Butler, *Trans. Ent. Soc. Lond.* p. 1 (1881) (type : *askoldensis*).

♂♀. Similar to *Celerio*. Palpus hairy at the sides. Eye strongly lashed. Antenna very feebly incrassate distally, almost filiform in ♂, slightly clubbed in ♀, hook gradual, consisting of seven to ten segments. Spines of abdomen weak, more numerous than in *Celerio*. First row of spines of first protarsal segment doubled at base ; pulvillus normal.

♂. Tenth tergite slender, much narrower than the sternite ; this flat, or slightly convex beneath, not keeled or boat-shaped, rounded-truncate or rounded at end. Clasper broadly sole-shaped, with a dozen or more friction-scales ; harpe (Pl. LII. f. 9) ending in a more or less spatulate process, which is concave on the upperside and is slightly curved upwards. Penis-sheath without apical process, but with a subapical oblique dentate ridge (Pl. LVI. f. 55).

Larva with the fourth segment swollen; strongly tapering in front, variegated with short brown divided lines which border pale dots, these brown markings vestigial in the green form of the larva: an ocellus on segments 4 and 5; horn short or vestigial.—Food-plants: *Galium*; *Epilobium*; *Vitis*; *Fuchsia*; etc.

Pupa rough, without gloss; tongue-case keeled in basal fifth; a distinct tubercle in front of eye; abdominal segments 5 to 7 with a subbasal belt of sharp tubercles, except on underside: cremaster broad at base and flattened, terminating in a slender process, the extreme tip of which is notched.

Hab. Palaearctic Region; China; North India.

Five species:

a. Fringe of hindwing not dotted with brown at the veins	*b.*	
Fringe of hindwing dotted with brown at the veins	*c.*	
b. Marginal area of hindwing bright rosy red	685.	*P. elpenor.*
Marginal area of hindwing red shaded with cinnamon	686.	*P. rivularis.*
c. Pronotum with pale edge, costal margin of hindwing below mottled with grey and brown	*c.*	
Pronotum uniformly red; costal margin of hindwing below red	687.	*P. porcellus.*
d. Abdominal segments with white edges	689.	*P. askoldensis.*
Abdominal segments without white edges	688.	*P. suellus.*

685. Pergesa elpenor.

Sphinx elpenor Linné, *l.c.* p. 491. n. 15 (1758).

♂♀. This species is not generically different from *porcellus* as nearly all authors have maintained; the two insects agree very closely and, what is just as important, disagree with all the other *Choerocampinae*, *rivularis*, *suellus* and *askoldensis* excepted.

The three subspecies of *elpenor* are not very sharply defined. While the Indian race is fairly well marked, the Japanese individuals are not always different from large European examples.

♂. Tenth tergite a little slenderer than in *porcellus*, sternite more rounded at end; friction-scales more numerous; process of harpe somewhat longer (Pl. LII. f. 9); dentate ridge of penis-sheath also longer (Pl. LVI. f. 55).

Larva: ocelli kidney-shaped, being concave at the ventral side; horn longer than in *porcellus*.

Pupa stout, three times as long as broad.

Hab. Palaearctic Region; China; North India.

Three subspecies:

a. Pergesa elpenor elpenor.

Mouf., *Theatr. Ins.* p. 93. f. 2 (1631); Merian, *Eur. Ins.* ii. p. 38. t. 73 (1683); Raj., *Hist. Ins.* p. 145. n. 2, p. 146. n. 3, p. 281. n. 16 (1710); Merian, *Eruc. Ortus* p. 54. t. 22 (*L. p., i. paras.*) (1717); Petiv., *Gazoph.* t. 10. f. 11. 12. 13 (1711); Alb., *Engl. Ins.* t. 9 (1720); Frisch, *Ins.* xii. p. 1. t. 1. f. 1. 2. 3 (1736); Roes., *Ins. Belust.* i. p. 25. t. 4 (1746); id., iv. p. 59 (1761);

Wilke, *Engl. Moths* p. 11. t. 7 (1773) ; Deg., *Mém. Hist. Ins.* i. p. 154. 158. 694. t. 9. f. 1. 2. 8. 9 (1752) ; id., *l.c.* ii. p. 236. n. 3 (1771) ; Geoffr., *Hist. Ins.* ii. p. 86. n. 10 (1762) ; Gronov, *Act. Helv.* v. p. 140. n. 312 (1762) ; id., *Zooph.* p. 202. 819 (1764) ; Seba, *Thesaur.* iv. t. 53. f. 9, t. 55. f. 1. 2 (1765) ; Harris, *Aurel.* p. 14. t. 7. f. 5. a—h (1766) ; Schaeff., *Icon.* t. 96. f. 4. 5. (1766) ; Ernst & Engr., *Ins. Eur.* iii. p. 99. f. 112. fig. d. e (1782).

Sphinx elpenor Linné, *Fauna Suec.* p. 288. n. 1089 (1746) ; id., *Syst. Nat.* ed. x. p 491. n. 15 (1758) ; id., *Fauna Suec.* ed. ii. p. 288. n. 1089 (1761) ; Scop., *Ent. Carn.* p. 186. n. 472 (1763) ; Linné, *Mus. Lud. Ulr.* 355. n. 15 (1764) ; Hufn., *Berl. Mag.* ii. p. 180. n. 7 (1766) ; Beckm., *Epit.* p. 160. n. 17 (1767) ; Houtt., *Nat. Hist.* i. 11. p. 439. n. 15 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 543. n. 25 (1767) ; Mein., *Naturf.* i. p. 243 (1774) ; Fabr., *Syst. Ent.* p. 543. n. 25 (1775) ; Harris, *Engl. Lep.* p. 24. n. 157 (1775) ; Fuessly, *Verz. Schweiz. Ins.* p. 32. n. 618 (1775) ; Gled., *Forstwissensch.* ii. p. 195. n. 4 (1775) ; Müll., *Zool. Dan.* p. 116. n. 1378 (1776) ; Den. & Schiff, *Verz. Schm. Wien* p. 43. n. n. 3 (1776) ; Mader, ed. Kleem., *Raupenkal.* p. 52. n. 142, p. 71. n. 200 (1777) ; Meyer, in Fuessly, *Mag. Ent.* i. p. 265 (1778) ; Fisch., *Naturg. Livland* p. 153. n. 344 (1778) ; Esp., *Schmett.* ii. p. 91. t. 9. f. 1—4, p. 200. t. 27. f. 3, t. 45. f. 1 (1779) ; Goeze, *Ent. Beytr.* iii. 2 p. 165. n. 17 (1780) ; Fabr., *Spec. Ins.* ii. p. ii. p. 148. n. 43 (1781) ; Lang, *Verz. Augsb.* p. 69. n. 567. 568 (1782) ; Fourcr., *Ent. Paris.* ii. p. 254. n. 10 (1785) ; Fabr., *Mant. Ins.* ii. p. 97. n. 47 (1787) ; Borkh., *Eur. Schm.* ii. p. 66. 136. 178. n. 2 (1789) ; Gmel., *Syst. Nat.* i. 5. p. 2382. n. 17 (1790) ; View., *Verz. Brandenb.* i. p. 8. n. 9 (1790) ; Rossi, *Fauna Etr.* ii. p. 162. n. 1054 (1790) ; Schwarz, *Raupenkal.* p. 353. n. 494 (1791) ; Brahm, *Insertenkal.* ii. 1. p. 528. n. 386 (1791) ; Borkh., *Rhein. Mag.* i. p. 315. n. 141 (1793) ; Fabr., *Ent. Syst.* iii. 1. p. 372. n. 51 (1793) ; Don., *Brit. Ins.* iv. p. 39. t. 122 (1795) ; Cederh., *Fauna Ingr.* p. 214. n. 654 (1798) ; Prun., *Lep. Ped.* p. 89. n. 178 (1798) ; Hoffm., *Naturf.* xxviii. p. 78 (1799) ; Schrank, *Fauna Boica* ii. 1. p. 227. n. 1391 (1801) ; Hübn., *Samml. Eur. Schm., Sphing.* p. 96. n. 3. t. 10. f. 61 (180—?) ; id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. *Leg.* B. b. f. 2. a. b (180— ?) ; Sepp. *Nat. Ins.* iii. p. 65. t. 18. f. 6. 78 (180— ?) ; Walck., *Faune Paris.* ii. p. 278 (1802) ; Ochs., *Schm. Eur.* ii. p. 209. n. 3 (1808) ; Nag., *Hülfsb. Schm.* p. 155 (1818) ; Sam., *Ent. Comp.* p. 243. t. 6. f. 2 (1819) ; God., *Pap. Eur.* iii. p. 99. t. 112. f. 160 a—g (1823) ; Lep. & Serv., *Enc. Méth.* x. p. 466. t. 64. f. 7—9 (1825) ; Meig., *Handb. Schm.* p. 95. n. 7 (1827) ; Boisd., *Ind. Meth.* p. 32 (1829) ; Meig., *Syst. Beschr. Schm.* p. 134. n. 3. t. 64. f. 2. 3. (1830) ; Lucas, *Lép. Eur.* p. 111. t. 46 (1834) ; Thon, *Nat. Schm.* p. 106. t. 52. f. 728—30 (1837) ; Zett., *Ins. Lapp.* p. 917 (1840) ; Ramb., *Faune Andal.* p. 334 (1842) (Malaga) ; Eversm., *Fauna Volgo-Ural.* p. 109 (1844) ; Herrich-Sch., *Eur. Schm.* ii. 1. p. 85. n. 9 (1847) ; Brutt., *Progr. Gymn. Dorpat* p. 24. n. 7 (1872) (v. vi.) ; Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 136. n. 173 (1882) (recensio critica).

Sphinx celerio Linné, *Syst. Nat.* ed. x. p. 491. n. 10 (1758) (sub syn.).

Sphinx elenor (!), Müller, *Naturs.* v. 1. p. 640. n. 17 (1774).

Sphinx porcus Retzius, *Gen. Ins.* p. 34. n. 29 (1783).

Deilephila elpenor, Laspeyres, *Jenaische Allg. Literatur-Zeit.* iv. p. 103 (1809) ; Ochs., *Schm. Eur.* iv. p. 43. n. 3 (1816) ; Steph., *Illustr. Brit. Ent., Haust.* i. p. 131 (1828) ; id., *Cat. Brit. Ins.* ii. p. 33 (1829) ; Cant., in Silberm., *Rev. Ent.* i. p. 77 (1833) (Dept. Var, vi. ix.) ; Treits., in Ochs., *Schm. Eur.* x. p. 129 (1834) ; Blanch., *Hist. Nat. Ins.* iii. p. 479. n. 2 (1840) ; Assm., *Zeitschr. Ent Breslau* i. p. 5 (1847) ; Rom., *Bull. Soc. Ent. France* p. 40 (1850) (caught by a flower !) ; Manu, *Wien. Ent. Mon.* iii. p. 92 (1859) (Sicily) ; Wilde, *Raup.* ii. p. 81. n. 6. t. 1. f. 8 (1860) ; Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.) ; Gir., *Bull Soc. Ent. France* p. 49 (1866) (pupa) ; Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Snell., *Vlind. Nederld.* p. 95 (1867) (v. vi.) ; Tengstr., *Act. Soc. F. F. Fenn.* x. p. 6. n. 94 (1869) ; Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 73 (1870) (Breda) ; Siebke, *En. Ins. Norv.* iii. p. 24. n. 2 (1874) ; Kill., *Jahrb. Nat. Ges. Graub* xxiii. p. 45 (1880) ; Alb., *Bull. Moscou* p. 379 (1882) (Moscow) ; Weism., ed. Meld., *Stud. Theor. Descr.* i. p. 177. t. 4. f. 17—23, 30—33 (1882) (larvae) ; Rom., *Mém. Lép.* i. p. 71 (1884) (Borjoum ; Lagodekhi ; vi. vii.) ; Lampa, *Ent. Tidskr.* vi. p. 27. n. 116 (1885) ; Haar, *Tijdschr. Ent.* xxix. p. 30 (1886) (Alblasserwaard) ; Fixs., in Rom., *Mém. Lép.* iii. p. 321. n. 96 (1887) (Corea, vii.) ; Amel., *Berl. Ent. Zeitschr.* xxxi. p. 261 (1887) (Dessau) ; Graes., *Berl. Ent. Zeitschr.* xxxii. p. 105. n. 183 (1888) (Amurland) ; Leech, *Proc. Zool. Soc. Lond.* p. 584. n. 17 (1888) (Japan ; China ; = *macromera* = *fraterna* = *lewisi*) ; Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889) ; Staud., in Rom., *Mém. Lép.* vi. p. 229. n. 215 (1892) (Amurld.) ; Hofm., *Raup. Grossschm.* p. 29. t. 8. f. 1 (1893) ; id., *Grossschm.* p. 29. t. 13. f. 7 (1894) ; Uff., *Iris* xiii. p. 170 (1895) (aberr.) ; Schultz, *Illustr. Zeit. Ent.* ii. p. 702 (1897) (aberr.) ; Vos, *Tijdschr. Ent.* xli. p. 80 (1898) (Apeldoorn) ; Herz, *Iris* xi. p. 250. n. 91 (1898) (Witim, Sib.) ; Barlel. in Rühl, *Grossschm.* ii. p. 116 (1900).

Elpenor vitis Oken, *Lehrb. Naturg.* iii. i. p. 760. n. 3 (1815) (= *elpenor*).

Oreus elpenor, Hübner, *Verz. bek. Schm.* p. 136. p. 1463 (1822).
Sphynx elpenor, Vogel, *Schmett. Cab.* x. p. 10. t. 5. f. 3 (*l*) (1829).
Choerocampa elpenor, Duponchel, in God., *Pap. France, Suppl.* ii. p. 160 (1835) : Westw. & Humphr., *Brit. Moths* i. p. 22. n. 3. t. 51 f. 7. 8 (1843) ; Wallengr., *Skand. Het. Fjär.* p. 44. n. 1 (1863) ; Fust, *Entom.* iii. p. 71 (1867) (northward to Edinbg.) ; Newm., *ibid.* iii. p. 127 (1867) (life hist.) ; id., *l.c.* vi. p. 81 (1873) (var.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 279. n. 76 (1875) ; Thed., *Ent. Tidskr.* ii. p. 105 (1881) ; Kane, *Entom.* xv. p. 234 (1882) (larva) ; Kroul., *Bull. Soc. Oural.* xi. p. 213. n. 88 (1885) (Sarapoul, v.) ; id. *l.c.* p. 239. n. 58 (1885) (Ourjoum).
Chaerocampa (!) *elpenor*, Walker, *List Lep. Ins. B. M.* viii. p. 127. n. 1 (1856) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 554. n. 1 (1877) ; Hamm., *Entom.* xiii. p. 280 (1880) (larva) ; Buckl., *Larva Brit. Lep.* ii. p. 113. t. 25. f. 3 (1887) : Poult., *Proc. Zool. Soc. Lond.* p. 206 (1887) (larva) : Swinh., *Journ. Bombay N. H. Soc.* iii. p. 117. n. 4 (1888) (Karachi) ; Barr., *Lep. Brit. Is.* ii. p. 59. t. 52. f. 1. 1 a—c (1893) ; Kirby, in Allen, *Nat. Libr., Moths* iv. p. 18. t. 98. f. 1 (1897) : Stand. & Rebel, *Cat. Lep.* ed. iii. p. 103. n. 759 (1901).
Metopsilus elpenor, Duncan, in Jard., *Nat. Libr.* xl. p. 161. t. 11. f. 1 (1836-43).
Deilephila porcellus × *elpenor*, Hnguenin, *Mitth. Schweiz. Ent. Ges.* iii. p. 510 (1872).
Theretra elpenor, Kirby, *Cat. Lep. Het.* i. p. 650. n. 1 (1892).
Deilephila elpenor hybr. *standfussi* Bartel, *l.c.* ii. p. 122 (1900) (type now in Mus. Tring).
Metopsilus porcellus hybr. *elpenorellus* Standinger, in Stand. & Reb., *Cat. Lep.* ed. iii. p. 104. n. 761. b (1901).

♂ ♀. Underside of wings : costal margin dark wax-yellow, this area dilated posticad on disc, forming generally one broad or two narrow discal bands.

Hab. Europe, eastwards to Amurland.

A series of larvae, pupae, and imagines in the Tring Museum from various localities.

The curious specimen figured by Esper, *l.c.* f. 27, may have been artificial.

b. P. elpenor lewisi.

Chaerocampa elpenor, Orza, *Lép. Japon* p. 36. n. 78 (1868) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 279. n. 76 (1875) (partim).
**Chaerocampa lewisi* Butler, *Proc. Zool. Soc. Lond.* p. 247. n. 23 (1875) (Japan) ; id., *Trans. Zool. Soc. Lond.* ix. p. 554. n. 2. t. 90. f. 13. 14. 15 (*l., p.*) (1877) ; Maass., *Stett. Ent. Zeit.* xli. p. 56 (1880) (= *elpenor* = *macromera* = *? fraterna*).
Chaerocampa elpenor, Leech, *Trans. Ent. Soc. Lond.* p. 120. n. 101 (1889) (Kiukiang) ; id., *Trans. Ent. Soc. Lond.* p. 282. n. 50 (1898) (Japan ; China).
Theretra lewisi, Kirby, *l.c.* p. 650. n. 2 (1892).
Deilephila elpenor var. *lewisi*, Bartel, in Rühl, *Grossschm.* ii. p. 121 (1900).

♂ ♀. On the whole more extended red on the underside than in the previous.

Hab. Japan ; China.

In the Tring Museum 1 larva, 11 ♂♂, 9 ♀♀ from : Yokohama, ix. ; Hakodate, vi.—vii. (Leech) ; Kiukiang, viii. ; Ta-tsien-lu, W. China.

c. P. elpenor macromera.

Chaerocampa elpenor var., Walker, *l.c.* viii. p. 127. sub n. 1 (1856) (N. India ; Silhet) ; Moore, *Proc. Zool. Soc. Lond.* p. 675 (1867) (Bengal).
**Chaerocampa macromera* Butler, *Proc. Zool. Soc. Lond.* p. 7. n. 12 (1875) (Silhet ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 554. n. 3 (1877) ; id., *Illust. Typ. Spec. Lep. Het. B. M.* v. p. 7. t. 79. f. 3 (1881) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 14. n. 80 (1887) (Shillong) ; Swinh., *Cat. Lep. Het. Mus. Oc.* i. p. 14. n. 57 (1892) (Silhet).
Chaerocampa elpenor, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 84. n. 119 (1892) (*macromera* = *fraterna* = *lewisi* = *rivularis*).
Theretra macromera, Kirby, *Cat. Lep. Het.* i. p. 650. n. 3 (1892) (syn. partim).

♂ ♀. Red marginal area of hindwing obviously broader than in the previous forms.

Hab. Assam.

In the Tring Museum 3 ♂♂, 7 ♀♀ from : Khasia Hills ; Shillong.

686. Pergesa rivularis.

**Chaerocampa rivularis* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 280. n. 77 (1875) (Simla ; Darjiling ;— coll. Charles Oberthür).

**Chaerocampa fraterna* Butler, *Proc. Zool. Soc. Lond.* p. 247. n. 24 (1875) (Simla ; N. India ;— Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 554. n. 4 (1877) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 7. t. 79. f. 4 (1881) ; Cot. & Swinh., *Cal. Moths Ind.* i. p. 14. n. 81 (1887) (Simla ; Sikhim).

Chaerocampa elpenor, Swinhoe, *Proc. Zool. Soc. Lond.* p. 514. n. 6 (1884) (Kurachi) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 14. n. 79 (1887) (Simla ; Karachi).

Deilephila elpenor, Butler, *Proc. Zool. Soc. Lond.* p. 613 (1881) (Kurrachi).

Theretra macromera, Kirby, *l.c.* i. p. 650. n. 3 (1892) (partim).

Theretra fraterna, id., *l.c.* n. 4 (1892).

♂ ♀. Like *elpenor*, but the rosy red parts of body and wings shaded over with cinnamon, being far less bright red than in *elpenor*, especially on the wings ; marginal area of hindwing as broad as in *macromera*.

Hab. N.W. and N. India : Sikhim to Chitral, southward to Kurachi.

In the Tring Museum 3 ♀ ♀ from : Chitral ; Simla ; Sikhim.

687. Pergesa porcellus.

Rös., *Ins. Belust.* i. p. 33. t. 5 (1746) ; Hemm., *Coll. Cur. Ins.* t. 9. f. d (175– ?) ; Geoffr., *Hist. Abr. Ins. Paris* ii. p. 88. n. 12 (1762) ; Deg., *Mém. Hist. Ins.* ii. p. 237. n. 4 (1771) ; Ern. & Engr., *Pap. Eur.* iii. p. 102. t. 113. f. 161.a—i (1782).

Sphinx porcellus Linné, *Syst. Nat.* ed. x. p. 492. n. 16 (1758) ; id., *Fauna Suec.* ed. ii. p. 288. n. 1090 (1761) ; Hufn., *Berl. Mag.* ii. p. 180. n. 8 (1766) ; Houtt., *Naturl. Hist.* i. 11. p. 439. n. 16 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 801. n. 18 (1767) ; Beckm., *Syst. Nat.* in *Epit.* red. p. 161. n. 10 (1772) ; Müll., *Naturs.* v. 1. p. 641. n. 18 (1774) ; Fuessly, *Verz. Schweiz. Ins.* p. 32. n. 619 (1775) ; Fabr., *Syst. Ent.* p. 544. n. 26 (1775) ; Harris, *Engl. Lep.* p. 24. n. 158 (1775) ; Gled., *Forstwissensch.* ii. p. 196. n. 5 (1775) ; Müll., *Zool. Dan.* p. 116. n. 1339 (1776) ; Den. & Schiff., *Verz. Schm. Wien* p. 43. n. 4 (1776) ; Mad., ed. Kleem., *Raupenkal.* p. 50. n. 144, p. 71. n. 201 (1777) ; Fisch., *Vers. Gesch. Livl.* p. 150. n. 345 (1778) ; Esp., *Schmett.* ii. p. 97. t. 10. f. 1. 3 (1779) ; Blum., *Handb. Naturg.* p. 365. n. 8 (1779) ; Goeze, *Ent. Beytr.* iii. 2. p. 168. n. 18 (1780) ; Fabr., *Spec. Ins.* ii. p. 149. n. 44 (1781) ; Lang, *Verz. Angsb.* p. 70. n. 569. 570 (1782) ; Fabr., *Mant. Ins.* ii. p. 97. n. 48 (1787) ; Borkh., *Eur. Schm.* ii. p. 64. 135. 178. n. 1 (1789) ; Gmel., *Syst. Nat.* i. 5. p. 2382. n. 18 (1790) ; Schwarz, *Raupenkal.* p. 355. 494. 633. 748 (1790) ; View., *Verz. Brandenb.* p. 8. n. 10 (1790) ; Rossi, *Fauna Etr.* ii. p. 15. n. 361 (1790) ; Brahm, *Ins. Kal.* p. 313. n. 199 (1791) ; Fabr., *Ent. Syst.* iii. 1. p. 375. n. 52 (1793) ; Borkh., *Rhein. Mag.* i. p. 314. n. 140 (1793) ; Cederb., *Fauna Ingr.* p. 214. n. 655 (1798) ; Schrank, *Fauna Boica* ii. 1. p. 228. n. 1392 (1801) ; Walck., *Faune Paris.* ii. p. 279 (1802) ; Hübn., *Samml. Eur. Schm., Sphing.* p. 95. n. 2. t. 10. f. 60 (180– ?) ; id., *Gesch. Eur. Schm., Sphing.* ii. *Leg.* B. b. f. 1. a. b (180– ?) ; Ochs., *Schm. Eur.* ii. p. 211. n. 1 (1808) ; Nag., *Hülfsb. Schm.* p. 156 (1818) ; Latr., in *Nouv. Dict. Hist. Nat.* xxxi. p. 25 (1819) ; Sam., *Ent. Comp.* p. 243 (1819) ; God., *Lép. France* iii. p. 50. t. 19. f. 1 (1823) ; Lep. & Serv., *Enc. Méth.* x. p. 466. t. 64. f. 10—12 (1825) ; Meig., *Handb. Schm.* p. 95. n. 8 (1827) ; Boisd., *Ind. Meth.* p. 32 (1829) ; Meig., *Syst. Beschr. Schm.* p. 135. n. 4. t. 64. f. 4 (1830) ; Lucas, *Lép. Eur.* p. 111. t. 45 (1834) ; Zett., *Ins. Lapp.* p. 917 (1840) ; Eversm., *Fauna Volgo-Ural.* p. 109 (1844) (v. vi.) ; Brutt., *Progr. Gymn. Dorpat* p. 24. n. 8 (1872) (v. vi.).

(?) *Sphinx bombyliformis* Linné, *Syst. Nat.* ed. x. p. 493. n. 27 (1758).

Elpenor porcellus, Oken, *Lehrb. Naturg.* iii. 1. p. 761. n. 4 (1815).

Deilephila porcellus, Laspeyres, *Jenaische Allg. Literatur-Zeit.* iv. p. 99 (1809) ; Ochs., *Schm. Eur.* iv. p. 43. n. 4 (1816) ; Steph., *Illustr. Brit. Ent., Haust.* i. p. 131. n. 8 (1828) ; id., *Cat. Brit. Ins.* ii. p. 33 (1829) ; Cant., in Silberm., *Rev. Ent.* i. p. 77 (1833) (Dept. Var, vi.) ; Blanch., *Hist. Nat. Ins.* iii. p. 478 (1840) ; Assm., *Zeitschr. Ent. Breslau* i. p. 5 (1847) ; Luc., *Bull. Soc. Ent. France* p. 107 (1847) (veget. paras.) ; Guér., *ibid.* p. 108 (1847) (veget. paras.) ; Rom., *ibid.* p. 40 (1850) (caught by a flower !) ; Vill., *ibid.* p. 102 (1858) ; Siev., *Bull. Moscou* p. 140 (1862) (St. Petersb.) ; Maun, *Wien. Ent. Mon.* vi. p. 66 (1862) (Brussa) ; Maur., *Tijdschr. Ent.* ix. p. 174 (1866) (Limburg) ; Snell., *Vlind. Nederld.* p. 94 (1867) (v. vi.) ; Tengstr., *Act. Soc.*

F. F. Fenn. x. p. 6. n. 95 (1869); Heyl., *Tijdschr. Ent.* xiii. p. 146. n. 74. t. 6. f. 1 (1870) (Breda, var.); Voll., *ibid.* p. 158 (1870) (same var.); Gooss., *Ann. Soc. Ent. France* p. 118 (1871) (larva var.); Siebke, *En. Ins. Norv.* iii. p. 24. n. 3 (1874); Megn., *Bull. Soc. Ent. France* p. 53 (1875) (grey var.; Digne); Bell., *ibid.* p. 78 (1875) (grey var.; Digne); Staud., *Hor. Soc. Ent. Ross.* xiv. p. 298 (1878); Fall., *Bull. Soc. Ent. France* p. 76 (1879) (var.; not red); Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 45 (1880); Allbr., *Bull. Moscou* p. 379 (1882) (Moscow); Rom., *Mém. Lép.* i. p. 71 (1884) (Tiflis; Borjoum; v. vi.); Lampa, *Ent. Tidskr.* vi. p. 27. n. 117 (1885); Kill., *l.c.* xxix. p. 8 (1886); Amel., *Berl. Ent. Zeitschr.* xxxi. p. 261 (1887) (Dessau); Hofm., *Raup. Grossschm.* p. 29. t. 8. f. 2, t. 50. f. 18 (1893); id., *Grossschm.* p. 30. n. 12. t. 18. f. 1 (1894); Kill. & Caff., *Jahrb. Nat. Ges. Graub.* xxxviii. *Jpp.* p. 20 (1895); Vos, *Tijdschr. Ent.* xli. p. 80 (1898) (Apeldoorn); Bartel, in Rühl, *Grossschm.* ii. p. 123 (1900).

Theretra porcellus, Hübner, *Verz. bek. Schm.* p. 135. n. 1448 (1822).

Sphynx porcellus, Vogel, *Schmett. Cab.* ii. p. 19. t. 7. f. 5. a. b (1822).

Chaerocampa porcellus, Duponchel, in God., *Pap. France, Suppl.* ii. p. 160 (1835); Westw. & Humphr., *Brit. Moths* i. p. 23. t. 23. f. 9. 10 (1843); Wallengr., *Skand. Het. Fjär.* p. 46. n. 2 (1863); Boisd., *Spec. Gén. Lép. Hét.* i. p. 280. n. 78 (1875).

Pergesa porcellus, Walker, *List Lep. Ins. B. M.* viii. p. 150. n. 1 (1856); Butl., *Trans. Zool. Soc. Lond.* ix. p. 547. n. 1 (1877).

Chaerocampa porcellus, Barrett, *Lep. Brit. Is.* ii. p. 55. t. 52. f. 2. 2a (1893); Weism., ed. Meld., *Stud. Theor. Desc.* i. p. 184. t. 4. f. 24—28 (1882) (larvae).

Metopsilus porcellus, Duncan, in Jard., *Nat. Libr.* xl. p. 163. t. 11. f. 2 (1843); Kirby, *Cat. Lep. Het.* i. p. 660. n. 11 (1892); id., in Allen, *Nat. Libr., Moths* iv. p. 26. t. 98. f. 2. 3 (1897); Staud. & Reb., *Cat. Lep.* ed. iii. p. 104. n. 761 (1901).

Deilephila porcellus var. *suellus*, Oudemans (*non* Staudinger, 1878), *Tijdschr. Ent.* xlii. p. 21 (1899) (Holland).

♂ ♀. The three insects *porcellus*, *suellus*, and *askoldensis* come so near each other that we were at first inclined to treat them as geographical races of the same species. *Suellus* connects *porcellus* completely with *askoldensis* when closely compared, combining characters of the one with characters of the other. However, *porcellus* and *suellus* occur together and are always different. From this we must conclude that they are independent of one another, *i.e.* are specifically distinct. If the differences between *porcellus* and *suellus* are of specific value, then we have no right, we think, to regard the differences between *suellus* and *askoldensis* otherwise than being also specific, although the similarity of *suellus* with *askoldensis* is a little more marked than between *suellus* and *porcellus*. Sexual armature scarcely different in the three insects.

Red colour of forewing occasionally absent. Marginal band of hindwing, above, rarely blackish.

♂. Tenth tergite convex at tip, feebly hooked in lateral aspect, about half the width of the sternite; this truncate with the angles rounded. Clasper broad; about a dozen friction-scales; process of harpe rather shorter than in *elpenor elpenor*; dentate ridge of penis-sheath also shorter.

Ocelli of larva rounded; horn vestigial.

Pupa much slenderer than that of *elpenor*, more than three times as long as broad; tubercle in front of eye pointed; abdominal belts of tubercles curved basad in middle, the tubercles here less high and more numerous than laterally.

Hab. Europe, eastward to Asia Minor and Transcaucasia.

A series of larvae, pupae, and imagines in the Tring Museum from various places.

688. Pergesa suellus.

Deilephila porcellus var., Leder, *Ann. Soc. Ent. Belg.* xiii. p. 28 (1869) (Hankyuda; As. m.).

Deilephila porcellus var.? *suellus* Staudinger, *Hor. Soc. Ent. Ross.* xiv. p. 298 (1878) (Amasia).

Deilephila porcellus var. *suellus*, Romanoff, *Mém. Lép.* i. p. 71. t. 4. f. 1 (1884) (Tiflis; Borjoum, Lagodekhi; Istissu; Suanetie; together with *porcellus*!).

Metopsilus porcellus var. a. *Deil. p.*, var. *suellus*, Kirby, *Cat. Lep. Het.* i. p. 660. sub n. 1 (1892).
Deilephila porcellus var. et ab. *suellus*, Bartel, in Rühl, *Grossschm.* ii. p. 127 (1900).
Metopsilus porcellus var. *suellus*, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 104. n. 761a (1901) (Pont.; Arm.; Ferg. m.).

♂♀. Pronotum edged with grey as in *askoldensis*, but not quite so distinctly; tergites 5 and 6 of abdomen with yellowish lateral apical spot. Body and wings cinnamon, with very little red colour. A prominent olivaceous median band on forewing. Costal margin of forewing below grey, irrorated with brown. Pale lateral border of mesothoracic tegula continued to frons, more or less distinct on pronotum.

Early stages not known.

Hab. Transcaucasia; Asia Minor.

In the Tring Museum 2 ♂♂, 3 ♀♀ from: Borshom.

689. Pergesa askoldensis.

**Smerinthus askoldensis* Oberthür, *Diagn. Lep. Alsk.* p. 5 (1879); id., *Et. Ent.* v. p. 25. n. 64. t. 1. f. 3 (1880) (Askold;—coll. Oberthür).
**Cinogon cingulatum* Butler, *Trans. Ent. Soc. Lond.* p. 2 (1881) (Japan;—Mus. Brit.).
Deilephila askoldensis, Graeser, *Berl. Ent. Zeitschr.* xxxii. p. 105. n. 184 (1888) (Amurland); Staud., in Rom., *Mém. Lép.* vi. p. 230. n. 217 (1892) (Amurld.); Bartel, in Rühl, *Grossschm.* ii. p. 128 (1900).
Cinogon askoldensis, Kirby, *Cat. Lep. Het.* i. p. 639. n. 1 (1892); Leech, *Proc. Zool. Soc. Lond.* p. 584. n. 18 (1888) (= *cingulatum*; Oiwake; Hakodate); Staud. & Reb., *Cat. Lep.* ed. iii. p. 104. n. 764 (1901).

♂♀. Abdominal segments with white fringe all round. Wings more distinctly dentate than in the two preceding species. Pale side-stripe of head and thorax distinct on prothorax; pale fringe of the latter also distinct.

Early stages not known.

Hab. Amurland; Japan.

In the Tring Museum 3 ♂♂ from: Sidemi; Japan.

CLVII. RHODAFRA gen. nov.—Typus: *opheltes*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* iii. p. 164 (1780).
Hyles Hübner, *Verz. bek. Schm.* p. 137 (1822) (partim; type: *gallii*).
Deilephila, Walker (*non* Laspeyres, 1809), *List Lep. Ins. B. M.* viii. p. 173 (1856).

♂♀. Antennae less clubbed than in *Celerio*. Second segment of palpus peculiar: scales mesially short, long right and left, the lateral ones especially long and hair-like, forming a kind of crest appearing as a continuation of the eye-lashes, the segment looking as if it were shorn mesially. Spines of abdomen weak as in *Pergesa*.

♂. Friction-scales small and numerous, process of harpe broad, rounded at end, hollowed out on the upperside (Pl. LII. f. 10), resembling the process of *Pergesa*. Penis-sheath with incrassate dentate apical edge ending at both sides in a short process.

Early stages not known.

Hab. South Africa.

As distinct from *Celerio* as is *Pergesa*.

Two species:

Forewing with broad creamy buff band from apex to hinder margin near base . . 690. *R. opheltes*.
Forewing without this band . . . . 691. *R. marshalli*.

690. Rhodafra opheltes.

Sphinx opheltes Cramer, *Pap. Ex.* iii. p. 164. t. 285. f. B (1780) (Cape ; "Coromandel" err. loci).
Hyles opheltes, Hübner, *Verz. bek. Schm.* p. 137. n. 1471 (1822).
Deilephila opheltes, Walker, *List Lep. Ins. B. M.* viii. p. 173. n. 17 (1856) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 568. n. 4 (1877) ; Kirby, *Trans. Ent. Soc. Lond.* p. 236 (1877) (Cape).
Deilephila mariae Wallengren, *Oefv. Vet. Ak. Förh.* xxxii. 1. p. 93 (1875).

♂♀. Abdomen with one large black basal side-patch. Cinnamon-tawny costal area of forewing, above, incised at the veins ; median vein pale. Underside more or less rosy red ; hindwing with black spot behind at base.

Hab. South Africa.

In the Tring Museum 15 ♂♂, 5 ♀♀ from : Grahamstown, Cape Colony ; Newcastle and Mooi R., Natal.

691. Rhodafra marshalli spec. nov.

♂. Occiput and thorax cinnamon, with a pale side-stripe ; abdomen (like upperside of forewing) pale buff, a black basal side-patch ; underside of abdomen somewhat deeper in tint ; palpus and breast washed with cinnamon.

Wings, *upperside*.——Forewing densely irrorated with brown speckles ; a conspicuous blackish brown stigma ; a blackish brown straight line from apex, where it is a little curved, to inner margin, which it reaches 3 mm. from angle ; area outside this line more densely speckled ; a black basal posterior patch.——Hindwing rosy red ; a large black basal patch from cell to abdominal margin, triangular, widest behind, not reaching to end of cell ; cross-veins and M with some black scales ; a black postdiscal band from costal margin to end of SM^2 ; marginal area buff, speckled with black ; anal angle creamy.

Underside buff, shaded with pink and ochraceous, densely irrorated with brown except in middle ; postdiscal line of upperside vestigial below ; marginal area more brown than disc.

Harpe more obliquely rounded at end than in *opheltes*, slightly acuminate. Dentate ridge of penis-sheath oblique, less symmetrical than in *opheltes*.

Length of forewing : 25 mm.

Hab. Mashonaland.

One specimen in the British Museum, collected by G. A. K. Marshall.

CLVIII. CHAEROCINA gen. nov.—Typus : *doherty*i.

♂♀. Allied to *Cechenena* and *Euchloron*. Second segments of palpi separate as in those genera, smoothly scaled, without apical tuft on innerside, naked surface longer than broad ; *no* cavity at end of first segment externally ; scaling of this segment very rough, appearing as if the greater number of the longer scales were rubbed away ; very *few scales* at apex of first segment on *innerside*.

Hab. East Africa.

One species.

In the absence of dense scaling from the end of the first segment of the palpus on innerside and in pattern similar to *Celerio*.

692. **Chaerocina dohertyi** (Pl. VI. f. 5, ♂).

♂♀. Head and thorax above green-brown, changing into tawny-olive on abdomen ; a creamy white lateral stripe on head and thorax ; a stripe on first segment of palpus, and upperside of legs creamy white ; scaling of antenna creamy buff ; breast orange-rufous, abdomen below ferruginous.

Wings, *above*.——Forewing greyish olive-green, darkest at base, on disc beyond end of cell, and between discal line and anal angle ; a creamy streak at inner margin between base and middle ; a black line beginning at costal margin close to apex and ending at apical third of inner margin, bordered pale proximally ; traces of two antemedian lines and of a line from stigma to inner margin ; stigma an olive-black circle ; distal margin concave in front, then convex ; apex acute.—— Hindwing geranium-pink, basal area black to apex of cell ; a black postdiscal band, shading off distally, not reaching anal angle, connected along SM^2 with basal area ; marginal area less bright pink.

Underside ferruginous, speckled with olive.——Forewing : basal area red, a broad black basal stripe behind ; two olive discal lines, parallel, somewhat S-shaped, curving costad in front, sometimes vestigial ; a broad greyish brown border, not very conspicuous, widest behind R^2 where it reaches distal discal line.——Hindwing : not quite so bright as forewing ; abdominal area pink, a somewhat S-shaped discal line corresponding to the second line of the forewing.

♂. Sexual armature of the usual type of the allied genera. Tenth tergite ; first slightly, in apical third more suddenly narrowed, tip rounded, feebly sinuate ; sternite rather flat beneath, apex truncate with the angles strongly rounded. Clasper with a great number of rather large friction-scales ; process of harpe slender, horizontal, extreme end curved upwards. Penis-sheath with a right and left process, asymmetrical, the left process flat and somewhat twisted, the right one slightly curved, projecting, with some teeth at proximal edge.

Length of forewing : ♂ 44—48 mm. ; ♀ 49 mm.

Early stages not known.

Hab. Kikuyu Escarpment, British East Africa, 6500—9000 ft., January and March 1901 (W. Doherty).

Twelve ♂♂, one ♀ in the Tring Museum.

One of the finest discoveries of our late friend in this family.

CLIX. EUCHLORON.—Typus : *megaera*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim ; type : *ocellata*).
Deilephila, Boisduval (*non* Laspeyres, 1809), *Faune Madag. Bourb.* p. 73 (1833).
Chaerocampa, id. (*nom* Duponchel, 1835), in Deleg., *Voy. Afr. Austr.* p. 596 (1847).
Philampelus, Walker (*non* Harris, 1839), *List Lep. Ins. B. M.* viii. p. 179 (1856).
Chlorima Gueuée (*nom* Desv., 1830), in Maill., *Ile Réunion* p. 32 (1862).
Euchloron Boisduval, *Spec. Gén. Lép. Hét.* i. p. 213 (1875) (type : *megaera*).

♂♀. Second segments of palpi divergent, touching one another only proximally, where their ventral scaling is long and tuft-like ; outer side of palpus simple, joint *not* open, *no* cavity at end of first segment ; inner surface of second segment *not* naked, being clothed with thin and rounded scales, which, however, do

not quite cover the mesial part of the surface, which is longitudinally impressed at each side (Pl. LIX. f. 24).

Early stages not known.

Hab. Aethiopian Region.

One species.

693. Euchloron megaera.

Sphinx megaera Linné, *Syst. Nat.* ed. x. p. 492. n. 19 (1758).

Euchloron megaera, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 214 (1875) (Guinea ; Madag. ; Bourbon).

♂ ♀. The underside of the body and hindwing is either green or tawny, with intergradations, irrespective of locality. The mesothoracic tegulae have the same long pale fringe as those of *Cechenena mirabilis*.

♂. Tenth tergite long, pointed ; sternite rounded at end, sides parallel. Friction-scales of clasper numerous ; harpe (Pl. LII. f. 7) forming a strong pointed hook ; inner surface of clasper densely clothed with long bristles. Penis-sheath of the same type as in *Rhagastis* : a slender right process, dentate at end, subcylindrical ; a broad flat left process, dentate at the edges (Pl. LVI. f. 57. 58).

♀. Lateral edges of vaginal plate raised : vaginal cavity covered in front and at the sides by a high ridge, which is minutely folded longitudinally, feebly chitinised, incised in middle, the two lobes strongly and broadly rounded.

Hab. Aethiopian Region.

Two subspecies :

a. E. megaera lacordairei.

**Deilephila lacordairei* Boisduval, *Faune Madag. & Bourb.* p. 73. t. 11. f. 1 (1833) (Madag. ; Bourb. ; —coll. Charles Oberthür).

Chlorina lacordairei, Guenée, in Maill., *Ile Réunion* p. 32 (1862) ; id., in Vins., *Voy. Madag.* p. 29 (1865) (=*lacordairei*) ; Mabille, *Ann. Soc. Ent. France* p. 297 (1879)(=*lacordairei*) ; Saalm., *Lep. Madag.* p. 124. n. 295 (1884) (Nossi-bé) ; Vins., *Pap. Bourbon* p. 13 (1891).

Euchloron megaera, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 214 (1875) (partim).

Euchloron lacordairei, Kirby, *Cat. Lep. Het.* i. p. 671. n. 2 (1892) (Madag. ; "Bombay" *loci error !*).

♂ ♀. Differs from the Continental race in the outer margin of the hindwing being distinctly shaded with green up to R^1 or SC^2, and in the black discal band of the same wing being narrower.

Hab. Madagascar and neighbouring islands.

In the Tring Museum 4 ♂♂, 1 ♀ from Madagascar.

b. E. megaera megaera.

Sphinx megaera Linné, *Syst. Nat.* ed. x. p. 492. n. 19 (1758) ; id., *Mus. Lud. Ulr.* p. 358. n. 18 (1764) ; Clerck, *Icon. Ins.* ii. t. 47. f. 2 (1764) ; Houtt., *Naturl. Hist.* i. 11. p. 450. n. 19 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 802. n. 21 (1767) ; Goeze, *Ent. Beytr.* iii. 2. p. 173. n. 21 (1780) (syn. partim) ; Gmel., *Syst. Nat.* i. 5. p. 2385. n. 21 (1790) ; Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 139. n. 176 (1882) (recens. crit.).

Choerocampa megaera, Boisduval, in Deleg., *Voy. Afr. Austr.* p. 595. n. 109 (1847) (Natal).

Philampelus megaera, Walker, *List Lep. Ins. B. M.* viii. p. 179. n. 11 (1856) (Ashanti ; Natal) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 577. n. 16 (1877) ; Plötz, *Stett. Ent. Zeit.* xli. p. 76. n. 283 (1880) (Cameroons) ; Druce, in James., *Story Rear Col.* p. 446 (1887) (Aruwimi).

Deilephila megaera, Hopffer, in Pet., *Reise Mozamb.* p. 422 (1862).

Euchloron megaera, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 214 (1875) (partim) ; Oberth., *Et. Ent.* iii. p. 31 (1878) (Zanzibar) ; Kirby, *Cat. Lep. Het.* i. p. 670. n. 1 (1892) ; Pagenst., *Jahrb. Hamburg. Wiss. Anst.* x. 2. p. 38. n. 102 (1893) (Sansibar, vii.).

Chlorina megaera, Dewitz, *Mitth. Münch. Ent. Ver.* iii. p. 26 (1879) ; Karsch, *Ent. Nachr.* xvii. p. 295. n. 9 (1891) (Cameroons).

♂ ♀. Our two St. Thomé specimens are rather small and have the black discal band of the hindwing narrow. Specimens with ferruginous underside of body and hindwing occur in West and East Africa.

Hab. Continental Africa and islands near the coast.

In the Tring Museum 15 ♂♂, 8 ♀♀ from: St. Thomé, xii. i. (Mocquerys); Bopoto and Yakusu, viii., Congo (K. Smith); Natal; Kilwa, Germ. E. Afr., v. (Reimer); Mombasa, v. (Dr. Ansorge); Ran, Nandi, ii. (Ansorge): Masindi, Uganda, xii. (Ansorge).

CLX. BASIOTHIA.—Typus: *medea*.

Sphinx, Fabricius (*non* Linné, 1758), *Spec. Ins.* ii. p. 143 (1781).
Deilephila, Boisduval (*non* Laspeyres, 1809), *Faune Madag. Bourb.* p. 73 (1833).
Choerocampa, id. (*non* Duponchel, 1835), in Deleg., *Voy. Afr. Austr.* p. 595 (1847).
Basiothia Walker, *List Lep. Ins. B. M.* viii. p. 124 (1856) (type: *idricus* = *medea*).
Chaerocampa, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 91 (1857).
Basiothea (!), Butler, *Trans. Zool. Soc. Lond.* ix. p. 552 (1877).
Gnathostypsis, id. (*non* Wallengren, 1858), *Ann. Mag. N. H.* (5). iv. p. 233 (1879).
Antinephele, Kirby (*non* Holland, 1889), *Cat. Lep. Het.* i. p. 643 (1892).

♂ ♀. Inner surface of palpus: scaling at apex of first segment dense and regular; second segment without apical tuft. On the outer side the first segment is strongly convex and bears a transverse crest of scales, resembling the crest found in *Sphingonaepiopsis*, but being much smaller, or this crest represented by a fringe along eye. Eye very strongly lashed. Antenna strongly clubbed in both sexes. Abdomen with weak and numerous apical spines.

Larva strongly tapering in front; with seven ocelli.—Food-plant: *Spermacoce*.

Pupa: tongue-case compressed, but not very prominent.

Hab. Aethiopian Region.

The four species are in shape rather similar to some *Temnora*.

Key to the species:

a.	Hind orange	694. *B. medea*.
	Hind brown	695. *B. laticornis*.
	Hind red; a white double line on abdomen .	696. *B. charis*.
	Hind red; a simple line on abdomen . .	697. *B. schenki*.

694. Basiothia medea.

Sphinx medea Fabricius, *Spec. Ins.* ii. p. 143. n. 19 (1781) (Afr. aequin.); id., *Mant. Ins.* ii. p. 94. n. 22 (1787); Gmel., *Syst. Nat.* i. p. 5. p. 2376. n. 64 (1790); Fabr., *Ent. Syst.* iii. 1. p. 363. n. 23 (1793).

Sphinx idricus Drury, *Illustr. Ex. Ins.* iii. p. 2. t. 2. f. 2 & *Index* (1782) (Africa).

Sphinx clio Fabricius, *l.c.* iii. 1. p. 377. n. 65 (1793) (Guinea); Auriv., *Ent. Tidskr.* xviii. p. 153. n. 85 (1897) (= *idricus*).

Sphinx anotherina Martyn, *Psyche* t. 23. f. 59. 60 (1797).

Deilephila idricus, Boisduval, *Faune Mad. Bourb.* p. 73. n. 4. t. 10. f. 5 (1833) (Bourbon; Mauritius; Madag.; Senegal; Guinea; = *clio*).

Choerocampa idricus (!), id., in Deleg., *Voy. Afr. Austr.* p. 595. n. 110 (1847) (Natal); Guén., in Maill., *Ile Réunion, App.* p. 21 (1862); id., in Vins., *Voy. Madag.* p. 29 (1865); Vins., *Papill. Bourbon* p. 13 (1891).

Basiothea idricus (!), Walker, *List Lep. Ins. B. M.* viii. p. 125. n. 1 (1856) (Natal; S. Leone); Möschl., *Verh. Zool. Bot. Ges. Wien* xxxiii. p. 288. n. 83 (1884) (Caffraria).

Sphinx? medea, Walker, *l.c.* viii. p. 263 (1856).

Chaerocampa idrieus, Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* p. 92. n. 1520 (1857); Mab., *Ann. Soc. Ent. France* p. 299 (1879) (Madag.).
Choerocampa transfigurata Wallengren, *Wien. Ent. Mon.* iv. p. 42. n. 42 (1860); id., *Kongl. Sv. Vet. Ak. Handl.* v. 4. p. 18 (Separ.) (1865); id., *Öfv. Vet. Ak. Förh.* p. 913 (1871) (= *idrieus*).
Choerocampa idrieus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 282. n. 80 (1875) (= *clio* = *medea* ?).
Basiothea (!) *idrieus* (!), Butler, *Trans. Zool. Soc. Lond.* ix. p. 552 (1877); id., *Proc. Zool. Soc. Lond.* p. 494. n. 44 (1884) (Aden); Druce, in Moloney, *W. Afr. Forestry* p. 492. n. 3 (1887); Holl., *Trans. Amer. Ent. Soc.* xvi. p. 62. n. 12 (1889) (Benita; Gaboon; Kangwé); Karsch, *Ent. Nachr.* xvii. p. 294. n. 5 (1891) (Cameroons); Butl., *l.c.* p. 843. p. 123 (1896) (Nyassald., Febr.).
Chaeracampa idreus (!), Saalmüller, *Lep. Madag.* p. 13 (1884).
Basiothea idrieus, id., *l.c.* p. 120. n. 276 (1884); Möschler, *Abh. Senk. Nat. Ges.* xv. p. 67. n. 150 (1890) (Gold Coast).
Choerocampa idrieus, Dewitz, *Mitth. Münch. Ent. Ver.* iii. p. 26 (1879).
Basiothia medea, Kirby, *Cat. Lep. Het.* i. p. 648. n. 1 (1892) (= *idriens* = *idrieus* = *clio* = *onotherina* = *transfigurata*).
Chaerocampa idricus (!), Fawcett, *Trans. Zool. Soc. Lond.*, xv. p. 310. t. 49. f. 1· 2 (*l., p.*) (1901).

♂ ♀. The green colour of this small insect fades easily into brown. The antenna of the ♂ is not much longer and thicker than that of the ♀. There is no constant geographical variation; the Madagascar specimens have apparently the two distinct discal lines of the forewing never dentate.

♂. Tenth tergite elongate-triangular, subcarinate basally, bi-impressed, sinuate at end and slightly curved ventrad; sternite triangular, obtusely rounded at apex. Process of harpe long, slender, compressed, feebly spatulate, apex obtuse; similar to the harpe of *H. eson*. Penis-sheath (Pl. LVII. f. 25. 26) with a process right and left, both dentate, the right one longer.

Larva with seven triangular dorso-lateral spots which are brown above and yellow below, spot of eleventh segment elongate, extended on to the horn.

Hab. Aethiopian Region: Africa; Madagascar and neighbouring islands; Aden.

In the Tring Museum 150-odd specimens from: Sierra Leone; Ogungu, Niger; Cape Colony; Natal; Nyassaland; German and British E. Africa; Uganda and Toru (Ansorge); Great Comoro; Madagascar.

695. Basiothia laticornis (Pl. V. f. 14, ♂).

**Gnathostypsis laticornis* Butler, *Ann. Mag. N. H.* (5). iv. p. 233 (1879) (Madag.;—Mus. Brit.); Saalm., *Lep. Madag.* p. 121. n. 277 (1884).
**Chaerocampa bifasciata* Mabille, *Ann. Soc. Ent. France* p. 345. n. 8 (1879) (Madag.;—coll. Mabille); Saalm., *l.c.* p. 123. n. 292 (1884).
Antinephele laticornis, Kirby, *Cat. Lep. Het.* i. p. 543. n. 4 (1892).
Metopsilus (?) *bifasciatus*, id., *l.c.* p. 660. n. 7 (1892).

♂ ♀. Antenna strongly clubbed in both sexes, obviously longer and thicker in ♂ than in ♀. Body above greyish mars-brown, without pale lateral line on head and thorax, underside paler.

Wings above like body, somewhat vinaceous cinnamon.——Forewing: three antemedian lines, 2 and 3 closer together, a burnt-umber-brown patch beyond apex of cell; three discal lines, 1 distinct behind, 2 indistinct, interspace between 1 and 2 burnt-umber-brown, line 3 as in *medea* parallel to margin, curving costad; interspace between 2 and 3 vinaceous cinnamon, a trace of an oblique apical line. ——Hindwing: margin and basal half somewhat deeper brown than disc; marginal band vestigial.

Underside: disc of forewing and the whole hindwing, except outer margin,

pale ferruginous, rest burnt-umber-brown ; marginal band of both wings vestigial ; no lines, but both wings with minute, short, transverse, burnt-umber-brown bars.

♂. Tenth abdominal tergite similar to that of *medea*, but very feebly sinnate ; sternite more pointed than in *medea*. Process of harpe, in side-view, gradually narrowed to a point, slender, gently curved, sabre-shaped, slightly dilated apically in ventral view. Penis-sheath with both the right and the left process prolonged, oblique, pointing somewhat distad, the left one slender (Pl. LVII. f. 27).

Early stages not known.

Hab. Madagascar.

In the Tring Museum 2 ♂♂, 1 ♀ from : Sirabe ; Madagascar.

696. Basiothia charis.

Chaerocampa charis Boisduval, in Deleg., *Voy. Afr. Austr.* p. 595. n. 10. b (1847) (Natal ; *nom. nud.*!): Wall., *K. Sv. Vet. Ak. Handl.* v. 4. p. 18 (Separ.) (1865) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 236. n. 15. t. 6. f. 4 (1875) (Natal) ; Westw., in Oates, *Matabeleld.* p. 354 (1881).

**Chaerocampa charis* Walker, *List Lep. Ins. B. M.* viii. p. 136. n. 15 (1856) (Natal ;—Mus. Brit.) ; Mén., *Enum. Corp. Anim. Mus. Petr., Lep.* p. 93. n. 1540 (1857) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 557. n. 20 (1877) ; Mab., *Ann. Soc. Ent. France* p. 298 (1879) (Madag. *ex errore* !) ; Saalm., *Lep. Mad.* p. 122. n. 286 (1884) (" Madag." *err. loci*) ; Holl., *Trans. Amer. Ent. Soc.* xvi. p. 63. n. 15 (1889) (Benita ; Kangwé).

**Chaerocampa celerionina* Walker, *l.c.* n. 16 (1856) (Congo ;—Mus. Brit.) ; Butl., *l.c.* n. 21 (1877).

Chaerocampa celerina (!), Boisduval, *l.c.* p. 238. n. 17 (1875).

Theretra charis, Kirby, *Cat. Lep. Het.* i. p. 652. n. 28 (1892) (Natal).

Theretra celerionina, id., *l.c.* n. 29 (1892).

♂♀. Similar to *schenki* ; abdomen with a double line above. First segment of palpus very strongly convex at end ; fringe near eye rather more prominent than in *schenki*.

The type of *celerionina* is a discoloured specimen of this species.

♂. Tenth segment similar to that of *schenki*, but the tergite more curved and distinctly sinnate, and the sternite rather shorter, subcarinate below. Process of harpe subcylindrical, straight, smooth, obtuse. Armature of penis-sheath (Pl. LVII. f. 29) : the apical margin produced on the left side into a dentate process, a similar, but shorter, process on the right side, besides some submarginal teeth.

♂. Edge of vaginal aperture more strongly chitinised than in *schenki*, forming a semicircular ridge.

Early stages not known.

Hab. Africa : Sierra Leone, Gaboon, South and East Africa.

In the Tring Museum 80-odd specimens from : Sierra Leone ; Cape Colony ; Natal ; German E. Africa ; Masindi, Uganda, i. (Ansorge).

697. Basiothia schenki.

**Chaerocampa schenki* Möschler, *Stett. Ent. Zeit.* xxxiii. p. 339 (1872) (Natal ;—coll. Staudinger) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 557. n. 19 (1877) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxxiii. p. 287. n. 80 (1884) (Caffraria) ; Westw., in Oates, *Matabeleld.* p. 354 (1881) ; Dist., *Natural. Transvaal* p. 236 (1892) (ix., Pretoria).

Chaerocampa protocharis Möschler, *Stett. Ent. Zeit.* xxxiii. p. 340 (1872).

Theretra schenckii (!), Kirby, *Cat. Lep. Het.* i. p. 652. n. 27 (1892).

♂♀. First and second segment of palpus strongly convex, first with a fringe along eye representing the crest of *medea*. Antenna very thick in ♂ ; hook abrupt. External row of spines of first protarsal segment doubled. White mesial line of abdomen always simple.

♂. Tenth abdominal segment of the type of *Xylophanes*; tergite gradually narrowed, rounded at tip; sternite concave above, convex beneath, apex obtusely rounded, upper surface transversely rugate. Process of harpe slender, feebly ∿-shaped, compressed, apex somewhat dilated, with upper surface concave. Penis-sheath (Pl. LVII. f. 28): a short row of teeth on the left side, a short, dentate, apical, process on the right side.

♀. Edge of vaginal opening feebly chitinised, not distinctly raised; ante-vaginal cavity large.

Early stages not known.

Hab. Africa: South and South East.

In the Tring Museum 30 ♂♂, 10 ♀♀ from: Cape Colony; Natal; Transvaal.

CLXI. HIPPOTION.—Typus: *celerio*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim; type: *ocellata*).
Spectrum Scopoli, *Intr. Hist. Nat.* p. 414 (1777) (partim; incl. type of *Sphinx*).
Deilephila Laspeyres, *Jenaische Allg. Literatur-Zeit.* iv. p. 99 (1809) (partim; type: *nerii*).
Elpenor Oken, *Lehrb. Nat.* iii. p. 760 (1815) (partim; type: *nerii*).
Amphion Hübner, *Verz. bek. Schm.* p. 134 (1822) (partim; type: *nessus*).
Hippotion id., *l.c.* (1822) (type: *celerio*).
Isoples id., *l.c.* (1822) (partim; type: *eson*).
Choerocampa, Duponchel, in Godart, *Lép. France, Suppl.* ii. p. 159 (1835) (partim; type: *nerii*).
Metopsilus Duncan, in Jard., *Natur. Libr.* xi. p. 154 (1836) (partim; type: *nerii*).
Pergesa Walker, *List Lep. Ins. B. M.* viii. p. 149 (1856) (partim; type: *porcellus*).
Panacra id., *l.c.*, p. 154 (1856) (partim; type: *automedon*).
Diodosida, Butler (*non* Walker, 1856), *Ann. Mag. N. H.* (5). x. p. 433 (1882).
Darapsa, id. (*non* Walker, 1856), *l.c.*
Theretra, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 649 (1892) (partim).

♂♀. Second segment of palpus without apical tuft of scales, and first segment densely scaled at apex, on inner side.

Antenna clubbed in ♀, not clubbed and longer in ♂. Palpus simple externally, with the exception of *irregularis*, in which the first segment has a regular apical cavity as in *Theretra*.

Larva strongly tapering in front, fourth segment generally swollen; one or more ocelli.

Pupa with compressed tongue-case.

Hab. Old World.

Nineteen species.

Key to the species:

a. Hindwing not red	*b*.	
Hindwing red or ferruginous at least in basal area	*j*.	
b. One or more complete lines on forewing, oblique	*c*.	
No distinct complete lines on forewing, scaling of antenna pink	714.	*H. rosae*.
No distinct complete lines on forewing, scaling of antenna cream-colour	715.	*H. rebeli*.

c. Forewing with a grey shadowy angulate band from apex to inner margin, which it reaches close to outer angle, no other lines	711.	*H. butleri.*
A line from apex to inner margin, not angulate, or more lines on forewing, or body and forewing ashy grey		*d.*
d. Head and thorax without pale side-stripe .	712.	*H. roscipennis.*
Head and thorax with pale side-stripe . . .		*e.*
e. A sharply marked pale band from apex of forewing to (a little before) middle of hinder margin, within the band two thin lines ; scales of antenna pink ; abdomen with conspicuous black subbasal lateral patch	698.	*H. geryon.*
The band absent, or gradually fading away distally		*f.*
f. Palpus with cavity at apex of first segment .	716.	*H. irregularis.*
Palpus without cavity at apex of first segment		*g.*
g. Forewing with whitish or pinkish band from apex to middle of inner margin, sharply defined costally; or with a conspicuous black discal band ; or with scarcely any lines ; or abdomen with pale dorso-lateral spots. Oriental Region	699.	*H. velox.*
Forewing with one or more straight lines from apex to inner margin ; abdomen not spotted ; mesothoracic tegula without pale mesial line. Aethiopian Region . .		*h.*
h. Hindwing with a pale band from costal to abdominal margin	709.	*H. balsaminae.*
Hindwing with a pale patch at anal angle .		*i.*
i. Thorax above russet-brown	713.	*H. batschi.*
Thorax above clayish isabella-colour, or pale cinnamon	710.	*H. saclavorum.*
j. Hindwing with black discal band which is posteriorly abbreviated ; base red . .		*k.*
Hindwing without black discal band . .		*l.*
k. Abdomen with black basal lateral patches .	700.	*H. osiris.*
Abdomen without black basal lateral patches; forewing with pale band	701.	*H. eclerio.*
Abdomen without black patches : forewing without pale band	702.	*H. isis.*
l. Lines in outer half of forewing, above, more or less straight		*m.*
Lines in outer half of forewing, above, irregular or absent		*p.*
m. Mesonotum without greyish white mesial stripe	703.	*H. eson.*
Mesonotum with greyish white mesial stripe		*n.*

n. Base of hindwing black ; a large pale anal area	704.	*H. echectus.*
Base of hindwing red, or no pale anal area . .		*o.*
o. First segment of palpus with conspicuous white lateral line close to eye . . .	705.	*H. rafflesi.*
First segment of palpus without conspicuous white lateral line close to eye . . .	706.	*H. boerhaviae.*
p. Forewing with some antemedian and several discal lines, the first line outside the cell widened to a band	707.	*H. brennus.*
Forewing without lines, except an oblique apical one	708.	*H. scrofa.*

698. Hippotion geryon.

**Choerocampa geryon* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 241. n. 21. t. 7. f. 3 (1875) (Antananarivo ; Nossi-bé ;—coll. Charles Oberthür).

Chaerocampa geryon, Butler, *Trans. Zool. Soc. Lond.* ix. p. 631 (1877) ; Mab., *Ann. Soc. Ent. France* p. 298 (1879) ; Saalm., *Lep. Madag.* p. 123. n. 289 (1884) (Nossi-bé).

Theretra geryon, Kirby, *Cat. Lep. Het.* i. p. 653. n. 36 (1892).

♂♀. The pink colour of the scaling of the antenna is a very conspicuous character of this species.

♂. Tenth abdominal segment of the same type as in *Xylophanes* : the tergite gradually narrowed, truncate, feebly sinuate ; sternite with parallel sides, convex beneath, rounded-truncate. Process of harpe obtuse, irregularly curved, pointing dorso-distad, apex somewhat flattened. Penis-sheath with two subdorsal series of teeth, both longitudinal, one at the right, the other at the left side, the latter a little more proximal than the former.

Early stages not known.

Hab. Malagassic Subregion : Madagascar ; Comoro Is.

This stands in a similar relation to *velox* as *osiris* does to *celerio*.

In the Tring Museum 12 ♂♂, 11 ♀♀ from : Madagascar ; Great Comoro.

699. Hippotion velox.

Sphinx velox Fabricius, *Ent. Syst.* iii. 1. p. 378. n. 68 (1793) : Auriv., *Ent. Tidskr.* xviii. p. 153. n. 86 (1897) (= *vigil*).

Sphinx [*Deilephila* (?)] *vigil*, Guérin, in Deless., *Voy. Ind.* ii. p. 80. t. 25. f. 1 (1843) (Pondicherry).

Chaerocampa velox, Walker, *List Lep. Ins. B. M.* viii. p. 146. n. 3 (1856) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 561. n. 40 (1877).

**Panacra ligularia* Walker, *l.c.* viii. p. 156. n. 3 (1856) (Ceylon ; Cape York ;—Mus. Brit.) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 288. n. 6 (1875) (= *vigil* on p. 246 !) ; Butl., *l.c.* ix. p. 551. n. 16 (1877 (syn. partim) ; Maass., *Stett. Ent. Zeit.* xli. p. 55 (1881) (= *vigil*) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 9. n. 11 (1891) (Brisbane ; Mackay ; C. York) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 13. n. 51 (1892) ; Kirby, *l.c.* n. 11 (1892) (= *yorkii*).

**Sphinx phoenyx* Herrich-Sch., *Aussereur. Schm.* f. 478 (1856) (Java ; — coll. Staudinger).

Panacra vigil, Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 270. n. 622 (1857) ; Walker, *l.c.* xxxi. p. 32 (1864) ; Moore, *Proc. Zool. Soc. Lond.* p. 793 (1865) (Bengal) ; Semp., *Verh. Zool. Bot. Ges. Wien* xvii. p. 699. n. 9 (1867) (larva) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 551. n. 15 (1877) ; Swinh., *Proc. Zool. Soc. Lond.* p. 287. n. 5 (1885) (Poona, ii. ; Bombay, ix.; descr. of larva) ; Swinh., *Trans. Ent. Soc. Lond.* p. 163. n. 10 (1890) (Rangoon ; Mandalay) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xliii. p. 101. n. 174 (1890) (E. Java) ; Kirby, *Cat. Lep. Het.* i. p. 663. n. 10 (1892).

**Chaerocampa swinhoei* Moore, *Proc. Zool. Soc. Lond.* p. 362. n. 3 (1862) (Formosa ; — Mus. Brit.).

Ancryx phoenyx, Walker, *l.c.* xxxi. p. 36 (1864).

Choerocampa phoenix (!), Koch, *Indo-Austr. Lep. Fauna* p. 53 (1865).
Choerocampa phoenyx, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 246. n. 25 (1875); Snell., *Tijdschr. Ent.* xx. p. 2 n. 8 (1877) (Java); id., *l.c.* xxii. p. 65. n. 13 (1879) (S. Celebes); Piep., *ibid.* xl. p. 97. t. 1. f. 1 (horn of *l.*) (1897).
Choerocampa vigil, Boisduval, *l.c.* p. 246. n. 26 (1875) (= *lignaria*).
**Choerocampa yorkii* id., *l.c.* p. 248. n. 28 (1875) (Mus. Brit.).
Pergesa swinhoei, Butler, *Trans. Zool. Soc. Lond.* ix. p. 548. n. 8 (1877).
Choerocampa yorkii, id., *l.c.* ix. p. 631 (1877); Kirby, *Trans. Ent. Soc. Lond.* p. 236 (1877); Misk., *l.c.* p. 13. n. 20 (1891).
Chaerocampa vigil, Pagenstecher, *Jahrb. Nass. Ver. Nat.* xli. p. 107. n. 206 (1888) (Amboina); id., *l.c.* xliii. p. 101. n. 175 (1890) (E. Java); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 86. n. 127 (1892); Semp., *Schm. Philipp.* ii. p. 396. n. 34. t. E. f. 9. 10. 11 (*l., p.*) (1896) (Luzon; Cebu; Mindanao); Pagenst., in Chun, *Zoologica* xii. 29. p. 12. n. 7 (1900) (Kinigunang).
Theretra velox, Kirby, *Cat. Lep. Het.* i. p. 655. n. 58 (1892).
Metopsilus swinhoei, id. *l.c.* p. 661. n. 16 (1892).
**Panacra rosea* Rothschild, Nov. Zool. i. p. 79. t. 6. f. 14 (1894) (Lifu; —Mus. Tring).
**Panacra lifuensis* id., *l.c.* (1894) (Lifu;—Mus. Tring); id., *l.c.* iii. t. 14. f. 13 (1896).
**Panacra griseola* id., *l.c.* p. 80 (1894) (Lifu;—Mus. Tring); id., *l.c.* iii. t. 14. f. 12 (1896).
**Panacra pseudovigil* id., *l.c.* (1894) (hab.?;—Mus. Tring).

♂ ♀. A very variable species both in size and pattern, especially on Lifu, the Fiji Is., Christmas I. and most likely other outlying districts. The markings of the body and wings disappear often almost entirely. Occasionally body and wings are washed with rosy red. The type of *lignaria* is the same specimen as the type of *yorki*.

♂. Tenth abdominal tergite gradually narrowed as in *geryon*, but apex sharply sinuate, the angles acute (Pl. XLV. f. 15); sternite (Pl. XLV. f. 16) suddenly narrowed distally into a triangular, pointed, slender, mesial process, which is somewhat curved upwards. Process of harpe slender, apex somewhat dilated, spoon-shaped. Penis-sheath with a right apical row of teeth, and a shorter left row, which is subapical (Pl. LVII. f. 37). Specimens from different localities the same in structure.

♀. Vaginal aperture narrow, a feebly chitinised, rather prominent lobe on each side (Pl. XLI. f. 16).

Larva green or brown; an eye-spot on the fourth segment.

Pupa not glossy; head-case not much projecting, compressed, the tongue-case being cariniform proximally; stigmata black; abdomen transversely striate near the stigmata, somewhat granulose dorsally, last two segments densely and finely punctured; cremaster narrow, divided, with several recurved hooks.

Hab. Indo-Australian Region, from Ceylon to Fiji.

In the Tring Museum 1 pupa, 150-odd specimens from: Ceylon; South and North India; Andamans; Nicobars; Penang; Java; Christmas I.; Lombok; Sumba; Teninber Is.; Amboina; Buru; German and British N. Guinea; d'Entrecasteaux Is.; Louisiade Archipelago; N. Pommern; Queensland; Lifu.

700. Hippotion osiris.

Deilephila osiris Dalman, *Anal. Entom.* p. 48. n. 21 (1823) (Africa); Bartel, in Rühl, *Grossschm.* ii p. 102 (1900).
Deilephila osyris (!) Boisduval, *Icon. Hist. Lép.* ii. p. 18. n. 1. t. 49. f. 1 (1834) (Spain); Dup., in God., *Lép. France, Suppl.* ii. p. 120. n. 48. t. 15. f. 5 (1835); Boisd., *Spec. Gén. Lép.* i. t. 10. f. 2 (1836).
Sphinx osyris, Rambur, *Faune Andal.* p. 332 (1842) (indig.?).
Chaerocampa osiris, Walker, *List Lep. Ins. B. M.* viii. p. 135. n. 14 (1856); Butler, *Trans. Zool. Soc. Lond.* ix. p. 557. n. 22 (1877); Dew., *Mitth. Münch. Ent. Ver.* iii. p. 26 (1879); Saalm.

Lep. Malag. p. 122. n. 287 (1884); Druce, in Moloney, *W. Afr. Forestry* p. 493. n. 6 (1887); Butl., *Proc. Zool. Soc. Lond.* p. 674. n. 157 (1893) (Zomba, vii.); Fawc., *Trans. Zool. Soc. Lond.* xv. p. 309. n. 11. t. 58. f. 3. 4. 5. 6 (*l.*, *p.*) (1900).

Chœrocampa osyris, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 237. n. 16 (1875); Staud. & Reb., *Cat. Lep.* ed. iii. p. 103. n. 754 (1901).

Chaerocampa osyris, Mabille, *Ann. Soc. Ent. France* p. 298 (1879) (Madag.).

Theretra osiris, Kirby, *Cat. Lep. Het.* i. p. 653. n. 30 (1892).

♂♀. Hindtibia nearly as long as hindwing. Antenna of ♂ very stout in proportion to that of ♀. Abdomen with two black side-patches.

♂. Tenth segment as stout as in *celerio*, but the sternite much more gradually narrowed to a point and rather obtuse. Harpe (Pl. LII. f. 25) compressed, feebly curved upwards at the extreme end, which is rounded ventrally; dorsal edge notched. Penis-sheath (Pl. LVII. f. 36): a feebly arched and rather long left row of teeth, the right row reduced to one subapical tooth.

Larva: a very large ocellus on fourth segment, followed by a smaller one on fifth; horn short; a pale dorso-lateral line on abdomen.

Pupa: not glossy; tongue-case very large, very prominent; abdominal segments transversely rugate, striate at the sides, with large punctures before the stigmata, posterior segment more smooth; stigmata black; cremaster narrow, conical, divided at end; a series of black ventral spots on abdomen.

Hab. Aethiopian Region, northward occasionally to Spain.

In the Tring Museum 3 pupa-cases, and 2 pupae, 19 ♂♂, 16 ♀♀ from: Sierra Leone (Dr. Clemens); Warri, Niger, iv. v. (Dr. Roth); Congo (Bentley); Toru, vi. (Dr. Ansorge); Kilwa, ii. (Reimer); Madagascar.

701. **Hippotion celerio.**

Petiver, *Gazoph.* t. 12. f. 9 (1702); Frisch, *Ins.* xiii. p. 4. t. 2. f. 1. 2. 3 (1738); Roes., *Ins. Belust.* iv. p. 59. t. 8 (1746); Ernst & Engr., *Pap. Eur.* iii. p. 94. t. 110. f. 157. c. d (1782).

Sphinx celerio Linné, *Syst. Nat.* ed. x. p. 491. n. 10 (1758) (syn. partim); Hufnag., *Berl. Mag.* ii. p. 182. n. 12 (1766); Houtt., *Naturl. Hist.* i. 11. p. 434. n. 10. t. 90. f. 3 (1767); Linné, *Syst. Nat.* ed. xii. p. 800. n. 12 (1767); Forster, *Cat. Anim. N. Am.* p. 29 (1771); Beekm., *Epit.* i. p. 160. n. 8 (1772); Müll., *Naturs.* v. 1. p. 639. n. 12. t. 20. f. 3 (1774); Mein., *Naturf.* i. p. 243 (1774); Fuessly, *Verz. Schweiz. Ins.* p. 32. n. 617 (1775); Fabr., *Syst. Ent.* p. 545. n. 30 (1775); Den. & Schiff., *Verz. Schm. Wien* p. 42. n. 2 (1776); Cram., *Pap. Exot.* ii. p. 42. t. 125. f. E (1777); Mad., ed. Kleem., *Raupenkal.* p. 53. n. 143, p. 71. n. 200 (1777); Esp., *Schmett.* ii. p. 83. 176. 201. t. 8. f. 1. 2. 3, t. 22. f. 1, t. 28. f. 1, t. 45. f. 3 (1779–82); Fabr., *Spec. Ins.* ii. p. 151. n. 50 (1781); Goeze, *Ent. Beytr.* iii. 2. p. 161. n. 12 (1780); Lang, *Verz. Augsb.* p. 69. n. 565 (1782); Fuessly, *N. Mag. Ent.* ii. p. 371 (1785); Fabr., *Mant. Ins.* ii. p. 97. n. 54 (1787); Borkh., *Eur. Schm.* ii. p. 70. n. 3 (1789); View., *Verz. Brandenb.* p. 10. n. 13 (1790); Gmel., *Syst. Nat.* i. 5. p. 2379. n. 12 (1790); Schwarz, *Raupenkal.* p. 509. n. 631 (1791); Borkh., *Rhein. Mag.* i. p. 315. n. 142 (1793); Fabr., *Ent. Syst.* iii. 1. p. 370. n. 13 (1793); Donov., *Brit. Ins.* vi. p. 25. t. 190 (1797); Prun., *Lep. Pedem.* p. 88. n. 176 (1798); Shaw, *Vir. Nat.* xx. t. 160 (180– ?); Hübn., *Samml. Eur. Schm., Sphing.* f. 59. 146. 167. 168. (180—?); id., *Gesch. Eur. Schm.* ii. *Sphing.* iii. *Leg.* B. a. b. f. 1. a. b (180—?); Ochs., *Schm. Eur.* ii. p. 205. n. 2 (1808); Nagel, *Hülfsb. Schm.* p. 154 (1818); God., *Lép. France* iii. p. 43. t. 18. f. 2 (1823); Lep. & Serv., *Enc. Hist. Nat.* x. p. 466. t. 65. f. 7. 8 (1825); Meig., *Handb. Schm.* p. 94. n. 6 (1827); Boisd., *Ind. Meth.* p. 32 (1829); Meig., *Syst. Beschr. Schm.* p. 134. n. 2. t. 60. f. 1 (1830); Luc., *Lép. Eur.* p. 110. t. 15 (1834); Bory, in Silberm., *Rev. Ent.* ii. p. 179 (1834) (Canaries); Friv., *ibid.* ii. p. 181 (1831) (Hungary); Lucas, *Lép. Eur.* p. 110. t. 45. f. 1 (1834); Ramb., *Faune Andalous.* p. 332 (1842); Guér., in Lef., *Voy. Abyss.* p. 386 (1845); Herr.-Sch., *Eur. Schm.* ii. p. 86. n. 12 (1847); Frey., *N. Beytr.* vi. p. 62. n. 950, p. 106. n. 1006. t. 518. 548 (1852); Luc., in Chenu, *Enc. Hist. Nat., Pap.* i. p. 264. fig. 468 (1853); Koferst., *Wien. Ent. Mon.* ii. p. 225 (1858); Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 139. n. 177 (1882) (recens. crit.; — *tisiphone* — *inquilinus* — *ocys*).

Sphinx tisiphone Linné, *Syst. Nat.* ed. x. p. 492. n. 2 (1758); id., *Mus. Lud. Ulr.* p. 359 (1769);

Houtt., *l.c.* i. 11. p. 456. n. 21 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 803. n. 23 (1767) ; Müller, *Naturs.* v. 1. p. 642. n. 23 (1774) ; Gmel., *l.c.* i. 5. p. 2386. n. 23 (1790).

Phalaena ingulinus Harris, *Exp. Engl. Ins.* p. 93. t. 28, *Lep.* f. 1 (1781).

Elpenor celerio, Oken, *Lehrb. Naturg.* iii. 1. p. 760. n. 2 (1815).

Elpenor phoenix, id., *l.c.* sub n. 2 (1815).

Deilephila celerio, Ochsenheimer, *Schm. Eur.* iv. p. 43. n. 2 (1816) ; Steph., *Illustr. Brit. Ent., Haust.* i. p. 128 (1828) ; id., *Cat. Brit. Ins.* ii. p. 33 (1829) ; Boisd., *Faune Madag. Bourb.* p. 72 (1833) ; Cant., in Silberm., *Rev. Ent.* i. p. 77 (1833) (Dept. Var, vii.) ; Boisd., Ramb. & Grasl., *Icon. Hist. Chenill., Sphing.* t. 13 (1834) ; Treit., in Ochs., *Schm. Eur.* x. p. 128 (1834) ; Pierr., *Bull. Soc. Ent. France* p. 86 (1846) (Paris) ; id., *l.c.* p. 91 (1846) (Clermont Ferrand) ; Lucas, *Expl. Sc. Algérie, Artic.* iii. p. 371. n. 66 (1849) ; Donz., *Bull. Soc. Ent. France* p. 225 (1850) (indigen. ?) ; Bruand, *ibid.* p. 54 (1857) ; Wilde, *Rasp.* ii. p. 81. n. 7 (1860) ; Oberth., *Et. Ent.* i. p. 32 (1876) (Algiers ; Oran) ; Staud., *Hor. Soc. Ent. Ross.* xiv. p. 298 (1878) (As. min.) ; Oberth., *Ann. Mus. Civ. Gen.* xv. p. 172. n. 60 (1879) (Abyss.) ; Kill., *Jahrb. Nat. Ges. Graub.* xxiii. p. 45 (1880) ; Oberth., *Ann. Mus. Civ. Gen.* xviii. p. 733. n. 83 (1883) (Bogos) ; Rom., *Mém. Lép.* i. p. 71 (1884) (Borjonm, 1 specim.) ; Oberth., *Bull. Soc. Ent. France* p. 215 (1885) (Bretagne) ; Dem., *ibid.* p. 55 (1886) (Reims) ; Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889) ; White, *Butt. and Moths Teneriffe* p. 69. t. 4. f. 2 (1894) ; Hofm., *Raup. Grossschm.* p. 29. 285. t. 7. f. 9 (1893) ; id., *Grossschm.* p. 30. n. 9. t. 17. f. 9 (1894) ; Bartel, in Rühl, *ibid.* ii. p. 104 (1900).

Hippotion celerio, Hübner, *Verz. bek. Schm.* p. 135. n. 1450 (1822) ; Moore, *Lep. Ceylon* ii. p. 16. t. 84. f. 4 (1882) ; Warr., *Proc. Zool. Soc. Lond.* p. 293. n. 4 (1888) (Campbellpore, vii.) ; Kirby, in Allen, *Natur. Libr., Moths* iv. p. 20. t. 99. f. 1. 2. 3 (1897).

Hippotion ocys Hübner, *Verz. bek. Schm.* p. 135. n. 1451 (1822).

Sphynx celerio, Vogel, *Schmett. Cab.* iv. p. 22. t. 8. f. 6. a. b (1823).

Chaerocampa celerio, Duponchel, in God., *Lép. France, Suppl.* ii. p. 160 (1835) ; Westw. & Humphr., *Brit. Moths* i. p. 21. t. 5. f. 1. 2. 3 (1843) ; Boisd., in Deleg., *Voy. Afr. Austr.* p. 595. n. 107 (1847) (Natal) ; Wall., *Kongl. Sv. Vet. Ak. Handl.* v. 4. p. 18 (1865) (Caffraria) ; Maur., *Tijdschr. Ent.* xiii. p. 124 (1870) (Venlo) ; Heyl., *ibid.* p. 146. n. 72 (1870) (Breda, viii. ix.) ; Snell., *ibid.* xv. p. 33 (1872) (Congo) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 238. n. 18 (1875) ; Dew., *Mitth. Münch. Ent. Ver.* iii. p. 26 (1879) ; Swinh., *Proc. Zool. Soc. Lond.* p. 513. n. 4 (1884) (Poona, Kurachi ; 3 or 4 broods ; *l.* on *Caladium*) ; Fors., *Trans. Ent. Soc. Lond.* p. 388 (1884) (Mhow, life hist.) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxxiii. p. 287. n. 79 (1884) (Caffr.) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xxxvii. p. 209 (1884) ; Waterh., *Proc. Ent. Soc. Lond.* p. 25 (1885) (Ramsgate) ; Stev., *ibid.* p. 26 (1885) (Brighton) ; Swinh., *Proc. Zool. Soc. Lond.* p. 434. n. 7 (1886) (Mhow, ix.—xi.) ; Pagenst., *l.c.* xxxix. p. 111. n. 4 (1886) (Aru) ; id., *l.c.* xli. p. 107. n. 203 (1888) (Amboina) ; Vins., *Pap. Bourbon* p. 13 (1891) ; Pagenst., *l.c.* xlix. p. 155. n. 116 (1896) (Sumba) ; id., in Cbun, *Zoologica* xii. 29. p. 11. n. 6 (1900) (Ralum ; ii. f. viii. ix.).

Chaerocampa celerio, Walker, *List Lep. Ins. B. M.* viii. p. 128. n. 2 (1856) ; Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 274. n. 634. t. 11. f. 1. 1a (1857) (fig. of larva incorrect) ; Koch, *Indo-Aust. Lep. Fauna* p. 53 (1865) ; Moore, *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal) ; Semp., *Verh. Zool. Bot. Ges. Wien* xvii. p. 700. n. 12 (1867) (larva) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 238. n. 18 (1875) ; Snell., *Tijdschr. Ent.* xx. p. 1. n. 2 (1877) (Java) ; id., *l.c.* p. 67 (1877) (Sumatra) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 557. n. 23 (1877) ; Snell., *l.c.* xxii. p. 65. n. 10 (1877) (S. Celebes) ; Mab., *Ann. Soc. Ent. France* p. 298 (1879) ; Green, *Entom.* xiv. p. 255 (1881) ; Butl., *Proc. Zool. Soc. Lond.* p. 613. n. 55 (1881) (Karachi, xi. xii.) ; Saalm., *Lep. Madag.* p. 123. n. 288 (1884) ; Butl., *l.c.* p. 494. n. 45 (1884) (Aden) ; Swinh., *Proc. Zool. Soc. Lond.* p. 288. n. 12 (1885) (Poona, vi.—xi. ; Bombay) ; Butl., *l.c.* p. 379. n 94 (1886) (Campbellpore, v.) ; Pagenst., *Iris* i. p. 86. n. 4 (1886) (Aru) ; Buckl., *Larv. Brit. Lep.* ii. p. 113. t. 25. f. 2 (1887) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 16. n. 88 (1887) ; Druce, in Moloney, *W. Afr. Forestry* p. 492. n. 5 (1887).; Swinh., *Journ. Bombay N. H. Soc.* iii. p. 118. n. 6 (1888) (Karachi ; xi. xii.) ; Druce, *Proc. Zool. Soc. Lond.* p. 220. n. 3 (1888) (Fiji) ; Holl., *Trans. Amer. Ent. Soc.* xvi. p. 63. n. 16 (1889) (Benita) ; Alph., in Rom., *Mém. Lép.* v. p. 224. n. 20 (1889) (Teneriffe) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 13. n. 19 (1891) (S. Aust. : N. S. W. ; Queensld.) ; Snell, *l.c.* xxxiv. p. 253 (1891) (Flores) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 17. n. 68 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 87. n. 123 (1892) ; Barr., *Lep. Brit. Is.* ii. p. 51. f. 1. a. b. (1895) ; Semp., *Schm. Philipp.* ii. p. 395. n. 31. t. f. 5. 6 (*l.*) (1896) (Luzon ; Bohol ; Cebu ; Mindanao ; Sulu) ; Dudg., *Journ. Bombay Nat. H. Soc.* xi p. 410. n. 123 (1898) (Sikbim, Bhutan, vii.—xii., up to 5000 ft.) ; Nurse, *Journ. Bombay N. H. Soc.* xii. p. 513 (1899) (Cutch) ; Staud. & Reb., *Cat. Lep.* ed. iii p. 103. n. 1 (1901) ; Sharpe, *Ann. Mag. N. H.* (7). viii. p. 284. n. 49 (1901) (Karonga I.).

Deilephila inquilinus, Walker, *l.c.* viii. p. 128. n. 2 (1856) (sub syn.).
(?) *Sphinx* spec., Saunders, *Trans. Ent. Soc. Lond.* (3). iv. t. 13. f. 2 (*l.*) (1858) (Natal).
Deilephila alba-lineata Montrouzier, *Ann. Soc. Linn. Lyon* (2). xi. p. 250 (1864) (Kanala).
Deilephila inquilina, Butler, *Trans. Zool. Soc. Lond.* ix. p. 557. n. 2 (1877) (sub syn.),
Phalaena inquinalis (!), Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 17. n. 68 (1892) (sub syn.).
Theretra celerio, Kirby, *Cat. Lep. Het.* i. p. 652. n. 31 (1892); Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 20 (1895) (Java); Holl., in Smith, *Through Unkn. Countr. Afr.* p. 412 (1897) (Somalild.).

♂ ♀. There is little variation in this wide-spread species. The lines within the silvery band of the forewing are sometimes nearly absent: the rosy discal spots of the hindwing are occasionally reduced in size. There is no difference between Aethiopian and Indo-Australian individuals. Some fresh specimens from the Trobriand Islands have a rosy flush over body and wings, while another individual from the same place has very little red on the hindwing. External row of spines on the first protarsal segment accompanied by a row of smaller spines.

♂. Sexual armature similar to that of *celerio*. Tenth segment shorter, stouter, the sternite much more abruptly narrowed into a sharp hook. Harpe much stouter, almost straight, compressed, upperside hollowed out apically, with the edges raised. Penis-sheath with two rows of teeth as in *celerio*.

♀. Vaginal aperture ovate, the edges raised to a low horseshoe-shaped ridge: no processes.

Larva green or brown; a large eye-spot on segment 4, a smaller one on 5; a pale dorso-lateral line, broad, distinct on thorax and last segments, generally vestigial on middle segments.—Food-plants: *Vitis*; *Rubiaceae*.

Pupa glossy; tongue-case large, strongly compressed, prominent; stigmata black; cremaster long, conical, thin, with some teeth.

Hab. Old World, everywhere except the far north and New Zealand.

In the Tring Museum 9 larvae, 3 pupae, 300-odd specimens from: various places in Europe; Continental Africa; St. Thomé; Comoro Is.; Madagascar; Oriental Region, eastwards to the Solomon Islands and Lifu.

702. **Hippotion isis** spec. nov.

♂. Dirty clay-colour, a lateral stripe on head and the under surface paler, no pale side-stripe on thorax. Wings, *above*.——Forewing like body, a blackish basal cloud posteriorly; a trace of an antemedian angulated line anteriorly, a small stigma, and a short discal dash R^2—R^3 black; five parallel discal lines, the three first faint, the fourth accentuated by vein-dots and continuous with the rather prominent oblique apical line; an ill-defined brownish patch at hinder margin before angle; distal marginal area with black speckles.——Hindwing as in *celerio*, rosy red; a blackish median band, not extended to abdominal margin, anteriorly dilated basad and joining also the blackish postdiscal band; veins streaked with black within rosy discal area.

Underside like upperside of forewing, speckled with brown scales; forewing from base to disc and a distal marginal band brown; this band feebly dentate; some larger costal speckles indicate a discal line on fore- and hindwing; the latter without distinct marginal band. SC^2 and R^1 of hindwing separate.

Tenth tergite cleft at end; apex of sternite rather suddenly narrowed and produced into an acute hook; ninth tergite ending mesially in a short process. Clasper with one truncate friction-scale; harpe similar to that of *osiris*, apex concave above. Penis-sheath with one tooth at the left side before end, and an apical patch of teeth at the right side.

Length of forewing : ♂, 29 mm.

Hab.—— ? Doubtless African.

One ♂ in the Stockholm Museum (ex coll. Schönherr).

Similar to *H. roseipennis* in the forewing, and to *H. celerio* in the hindwing.

703. Hippotion eson.

Sphinx eson Cramer, *Pap. Exot.* iii. p. 57. t. 226. f. c (1779) ; Coq. & Luc., *Bull. Soc. Ent. France* p. 57 (1865) (parasite).

Isoples eson, Hübner, *Verz. bek. Schm.* p. 135. n. 1452 (1822).

Deilephila eson, Boisduval, *Faune Madag. Bourb.* p. 71 (1833) (Maurit. ; Bourb. ; Madag. ; Cap. b. sp. ; "Coromandel" *alia spec.* ; larva, pupa).

Chaerocampa eson, Boisduval, in Deleg., *Voy. Afr. Austr.* p. 595 (1847) (Natal) ; Guen., in Vins., *Voy. Madag.* p. 29 (1865) ; Boisd., *Spec. Gén. Lép. Hét.* i. 232. n. 9 (1875) (larva) ; Vins, *Pap. Bourb.* p. 13 (1891) ; Schaus & Clem., *Sierra Leone Lep.* p. 18 (1893).

Chaerocampa eson, Walker, *List Lep. Ins. B. M.* viii. p. 137. n. 17 (1856) (partim) ; Wallengr., *Kongl. Sv. Vet. Ak. Handl.* v. 4. p. 18 (Separ.) (1865) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 555. n. 10 (1877) ; Mab., *Ann. Soc. Ent. France* p. 299 (1879) (Madag.) ; Saalm., *Lep. Madag.* p. 122. n. 282 (1884) ; Druce, in Moloney, *W. Afr. Forestry* p. 492. n. 4 (1887) ; Holl., *Trans. Amer. Ent. Soc.* xvi. p. 63. n. 14 (1889) (Benita) ; Karsch, *Ent. Nachr.* xvii. p. 294. n. 6 (1891) (Cameroons) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 85. n. 121 (1892) (partim).

**Chaerocampa gracilis* Butler, *Proc. Zool. Soc. Lond.* p. 8. n. 13. t. 2. f. 2 (1875) (Congo ; Sierra Leone.—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 556. n. 11 (1877) ; Maass., *Stett. Ent. Zeit.* xli. p. 56 (1881) (= *eson*) ; Saalm., *l.c.* n. 283 (1884).

Chaerocampa thyelia, Westwood (*nom* Linné, 1758), in Oates, *Matabeleld.* p. 355 (1881).

Theretra eson, Kirby, *Cat. Lep. Het.* i. p. 651. n. 13 (1892) ; Holl., in Smith, *Through Unkn. Countr. Afr.* p. 412 (1897) (Somaliland).

Theretra gracilis, Kirby, *l.c.* n. 14 (1892).

Chaerocampa eson var. *gracilis* Butler, *Proc. Zool. Soc. Lond.* p. 843 n. 124 (1896) (Nyassaland, ii.).

♂♀. Widely distributed over the Aethiopian region. Variable in size. Forewing with nine lines. The pale subanal cloud of the hindwing sometimes absent, rarely enlarged to a submarginal band.

♂. Tenth tergite gradually narrowed, rounded at end, not sinuate (Pl. XLV. f. 18) ; sternite parallel at sides, apex obtusely rounded, almost truncate. Process of harpe (Pl. LII. f. 26) long, slender. Penis-sheath (Pl. LVII. f. 35) armed at the left side with a short row of teeth, on the right side with a prominent dentate process, which points obliquely disto-laterad.

♀. Anterior and lateral edges of the vaginal aperture somewhat raised to a ridge which terminates abruptly posteriorly on each side of the opening (Pl. XLI. f. 15).

Larva with ocellus on fourth segment.

Cremaster of pupa flattened, triangular, with some acute lateral teeth pointing anad, two apical ones recurved.

Hab. Aethiopian Region ; common.

In the Tring Museum 2 larvae, 2 pupae, 150-odd specimens from : Sierra Leone ; Gold Coast ; Niger ; Congo ; Toro and Uganda (Dr. Ansorge) ; British and German E. Africa ; Nyassaland ; Delagoa Bay ; Natal ; Cape Colony ; Great Comoro ; Madagascar ; Mauritius ; Bourbon.

704. Hippotion echeclus.

Chaerocampa eson, Walker (*nom* Cramer, 1778), *List Lep. Ins. B. M.* viii. p. 137. n. 17 (1856) (partim) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 85. n. 121 (1892) (partim) ; Semp., *Schm. Philipp.* ii. p. 394. n. 29 (1896) (Luzon ; Bohol ; Cebu ; iii. x. xi.).

**Chaerocampa echeclus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 233. n. 10 (1875) (Philippines ;—coll. Charles Oberthür) ; Snell., *Tijdschr. Ent.* xxii. p. 65. n. 9 (1879) (S. Celebes).

**Chaerocampa elegans* Butler, *Proc. Zool. Soc. Lond.* p. 8. n. 14. t. 2. f. 1 (1875) (Java ; Silhet ;— Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 556. n. 12 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 15. n. 84 (1887) ; Swinh., *Trans. Ent. Soc. Lond.* p. 163. n. 11 (1890) (Bassein : Rangoon) ; Hamps., *Illustr. Typ. Specim. Lep. Het. B. M.* viii. p. 1. n. 18 (1891) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 16. n. 63 (1892) (Java).

Theretra elegans, Kirby, *Cat. Lep. Het.* i. p. 651. n. 15 (1892) ; Huwe, *Berl. Ent. Zeit.* xl. p. 364. n. 17 (1895) (Java).

♂ ♀. Thorax with whitish grey mesial stripe. Closer allied to *boerhaviae* than to *eson*.

♂. Tenth tergite much stouter than in *eson*, sinuate (Pl. XLV. f. 17) ; sternite triangular, narrowed to a point, apex curved upwards, almost hooked Process of harpe (Pl. LII. f. 27) short, rounded, armed dorsally at end with a tooth, one or more teeth at the ventral edge, dorsal edge clothed with long scales. Penis-sheath (Pl. LVII. f. 34) : a curved row of teeth on the left side, and a few subapical teeth on the right, no process.

♀. Vaginal plate as in *eson*, but the ridge at the opening not so distinct and gradually fading away.

Early stages not known.

Hab. Oriental Region : India to the Philippines, Celebes and Sumba.

In the Tring Museum 10 ♂♂, 14 ♀♀ from : South India (Madura district) ; Bassein : Sumatra : Java ; Lombok : Sumba.

705. Hippotion rafflesi.

Sphinx theylia, Cramer (*non* Linné, 1767), *Pap. Exot.* iii. p. 58. t. 226. f. F (1779) (Coromandel).

Chaerocampa eson, Walker (*non* Cramer, 1779), *List Lep. Ins. B. M.* viii. p. 137. n 17 (1856) (partim).

Chaerocampa theylia, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 231. n. 8 (1875) (partim).

**Chaerocampa rafflesi* Butler, *Trans. Zool. Soc. Lond.* ix. p. 556. n. 14 (1877) (Java ; Canara :— Mus. Brit.) ; Swinh., *Proc. Zool. Soc. Lond.* p. 289. n. 13 (1885) (Poona. xi. xii. ; Bombay. ix.) : Cot. & Swin., *Cat. Moths Ind.* i. p. 45. n. 86 (1887) (partim) ; id., *Trans. Ent. Soc. Lond.* p. 163. n. 12 (1890) (Mandalay) ; id., *Cat. Lep. Het. Mus. Ox.* i. p. 17. n. 66 (1892) (partim).

Chaerocampa theylia, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 85. n. 122 (1892) (partim : form *vinacea*).

Theretra rafflesi, Kirby, *Cat. Lep. Het.* i. p. 651. n. 17 (1892) ; Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 19 (1895) (Java).

**Chaerocampa vinacea* Hampson, *Illust. Typ. Specim. Lep. Het. B. M.* ix. p. 57. t. 157. f. 26, t. 175. f. 2. 2a (*l., p.*) (1893) (Ceylon :—Mus. Brit.).

♂ ♀. The differences in colour between this species and *boerhaviae* are very slight. *H. rafflesi* has the body and wings more red than *boerhaviae*, at least than western specimens of this : the palpus is more washed with vinaceous, except a sharply marked white line on the first segment along the eye : the discal lines 1 and 2 of the forewing above are merged together in a band which is anteriorly more prominent than in *boerhaviae*, the interspaces following are paler, line 5 is again heavier ; there is no distinct clayish subanal patch on the hindwing ; the base of the latter often clayish brown.

♂. Tenth tergite sharply sinuate as in *echeclus*, the lobes rather shorter than in *boerhaviae* ; sternite suddenly narrowed to a sharp hook (Pl. LVIII. f. 28). Process of harpe (Pl. LII. f. 28) short, rounded, with a short subterminal tooth nearly as in *echeclus* ; a tuft of scales as in *echeclus*. Penis-funnel short, triangular ; penis-sheath nearly as in *echeclus*, 0 to 3 teeth on the right side, and a row of teeth on the left.

♀. Proximal and lateral edges of vaginal opening raised to a somewhat lyre-shaped ridge.

Larva with an eye-spot on segments 4 to 10, the spots of nearly the same size, except the first, which is larger ; horn long.

Hab. Ceylon to North India, eastwards to Java and Celebes.

Our single Celebes specimen is large, deep in colour, and has the basal area of the hindwing brown, a character found also, but less pronounced, in individuals from other localities.

In the Tring Museum 1 larva, 30 specimens from : Ceylon : South and North India : Sumatra ; Java ; S. Celebes.

706. Hippotion boerhaviae.

Zschach, *Mus. Lesk.* p. 95. t. 3. (1778).

Sphinx theylia, Cramer (*non* Linné, 1767), *Pap. Exot.* iii. p. 58. t. 226 f. E (1779 (Coromandel) ; Goeze, *Ent. Beytr.* iii. 2. p. 176. n. 24 (1780) (partim).

Sphinx boerhaviae Fabricius, *Syst. Ent.* p. 542. n. 22 (1775) (E. Indies) ; Sulz., *Abg. Gesch. Ins.* ii. p. 40. t. 20. f. 3 (1776) ; Leske, *Anfangsgr. Nat.* i. p. 457. n. 57 (1779) ; Goeze, *Ent. Beytr.* iii. 2. p. 207. n. 13 (1780) ; Fabr., *Spec. Ins.* ii. p. 148 n. 39 (1781) ; id., *Mant. Ins.* ii. p. 96. n. 43 (1787) (partim ; *err. typ.* !) ; Roem., *Gen. Ins.* p. 72. t. 20. f. 3 (1789) ; Fabr., *Ent. Syst.* iii. 1. p. 371. n. 46 (1793) (partim ; descript. spec. *boerh. et pluto* dict. commixtae) ; Turt., *Syst. Nat.* iii. 2. p. 175 (1806).

Sphinx rampyrus Fabricius, *Mant. Ins.* ii. p. 98. n. 66 (1787) (India) ; Gmel., *l.c.* i. 5. p. 23. 79. n. 72 (1790).

Sphinx boerhaaviae (!), Gmelin, *Syst. Nat.* i. 5. p. 2381. n. 77 (1790) (partim).

Sphinx octopunctata Gmelin, *l.c.* i. 5. p. 2386. n. 162 (1790).

Sphinx theylia, Fabricius, *Ent. Syst.* iii. 1. p. 378. n. 70 (1793) (partim).

Isoples theylia, Hübner, *Verz. bek. Schm.* p. 135. n. 1455 (1822) (partim) ; Moore, *Lep. Ceylon* ii. p. 19. t. 84, f. 5 (1882).

Chaerocampa eson, Walker (*non* Cramer, 1779), *List Lep. Ins. B. M.* viii. p. 137. n. 17 (1856) (partim).

Sphinx boerhaviae (!), Walker, *l.c.* (1856) (sub syn.).

Sphinx (?) rampyrus, *l.c.* p. 263 (1856).

Chaerocampa thyelia, Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 276. n. 638 (1857) (partim) ; Walk., *Journ. Linn. Soc. Lond.* vi. p. 84. n. 7 (1862) (Sarawak ; "Africa" alia spec.) ; Snell., *Tijdschr. Ent.* xx. p. 1. n. 4 (1877) (Java) ; id., *l.c.* p. 67 (1877) (Sumatra) ; Mab., *Ann. Soc. Ent. France* p. 298 (1879) ("Nossi-bé" *err. loci !*) : Butl., *Proc. Zool. Soc. Lond.* p. 670. n. 33 (1880) (Formosa) ; Saalm., *Lep. Madag.* p. 122. n. 285 (1884) ("Madag" *err. loci*) ; Swinh., *Proc. Zool. Soc. Lond.* p. 288. n. 12 (1885) (Poona, vi.—xi. ; Bombay, viii.—xi.) ; Pagenst., *Iris* i. p. 86. n. 3 (1886) (Aru) ; id., *Jahrb. Nass. Ver. Nat.* xxxix. p. 110. n. 3 (1886) (Aru) ; Swinh., *Journ. Bombay N. H. Soc.* iii. p. 118. n. 5 (1888) (Karachi ; vii. ix.) ; Pagenst., *l.c.* xli. p. 106. n. 201 (1888) (Amboina) ; Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 10. n. 15 (1891) (partim) ; Snell., in Snellem., *Midden-Sumatra* ii. p. 29 (1892) ; Piep., *Tijdschr. Ent.* xl. p. 97. t. 1. f. 3 (1897) (horn of larva, bad) ; Pagenst., in Chun, *Zoologica* xii. 29. p. 10. n. 4 (1900) (syn. partim).

Chaerocampa thyelia, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 231. n. 8 (1875) (partim) ; Fors., *Trans. Ent. Soc. Lond.* p. 389 (1884) (Mhow, life hist.) ; Swinh., *Proc. Zool. Soc. Lond.* p. 434. n. 6. (1886) (Mhow, ix.—xi.)

Pergesa rampyrus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 549. n. 11 (1877).

Chaerocampa thyelia, id., *l.c.* ix. p. 556. n. 13 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 15. n. 85 (1887) (partim) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 16. n. 64 (1892) (partim) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 85. n. 122. fig. 53 (1892) (partim) ; Hamps., *Illustr. Typ. Specim. Lep. Het. B. M.* ix. p. 56. t. 175. f. 1 (1893) (larva) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 410. n. 123 (1898) (Sikhim ; Bhutan ; larva) ; Nurse, *ibid.* xii. p. 513 (1899) (Cutch).

Chaerocampa ? thyelia, Snellen, *Tijdschr. Ent.* xxii. p. 65. n. 8 (1877) (S. Celebes).

**Chaerocampa rosetta* Swinhoe, *Cat. Lep. Het. Mus. Ox.* p. 16. n. 65 (1892) (Ceram ; Melville I. :— Mus. Oxford).

Theretra thyelia, Kirby, *Cat. Lep. Het.* i. p. 651. n. 16 (1892 (partim) ; Huwe, *Berl. Ent. Zeit.* xl. p. 364. n. 18 (1895) (Java) ; Pagenst., *Abh. Senk. Nat. Ges.* xxiii. p. 443. n. 423 (1897) (Celebes ; Borneo).

Chaerocampa rafflesi, Hampson, *l.c.* t. 175. f. 3 (larva) (1893).
Chaerocampa boerhaviae, Semper, *Schm. Philipp.* ii. p. 394. n. 30 (1896) (Luzon ; Bohol ; Cametes ; Cebu ; ii.).
Isoples thyelia, Kirby, in Allen, *Nat. Libr., Moths* iv. p. 24 (1897).

♂♀. There is a good deal of individual variation in this species as regards colour and size. It is not always an easy matter to distinguish certain individuals from *rafflesi*. Some Papuan specimens are fully as vinaceous as *rafflesi* on the wings and body ; but also here the first palpal segment is paler and does not show the white line so well. A band or patch on the upperside of the forewing near hinder angle beyond lines 5 or 6 is in western individuals often somewhat ochraceous, in eastern specimens, however, mostly as reddish as in many *rafflesi*.

♂. Tenth segment as in *rafflesi*, but the apical hook of the sternite obviously longer (Pl. LVIII. f. 27). Process of harpe (Pl. LII. f. 29) stout, rounded at end, with a long dorso-apical tooth curved towards the clasper. Penis-funnel elongate-triangular ; penis-sheath as in *rafflesi*, but the row of teeth on the left side with more teeth, which are either simple or divided.

♀. Edges of vaginal aperture less raised than in *rafflesi*.

Larva with a large eye-spot on segment 4, the eye-spots on the following segments gradually smaller ; much less regular than in *rafflesi*, often vestigial ; horn short, pale.

Hab. Ceylon to North India, eastwards to the Solomon Islands.

In the Tring Museum 1 larva, 200-odd specimens from : Ceylon ; South and North India ; Malay Pen. ; Penang ; Bunguran, Natuna Is. ; Borneo ; Sumatra ; Java ; Lombok ; Sumba ; Celebes ; Kisser ; Larat ; Key ; Queensland ; New Guinea ; Trobriand Is. ; Louisiade Archipelago ; Woodlark ; N. Pommern ; N. Lauenburg ; N. Hanover ; Kulambangra and Guadalcanar, Solomon Is. (Meek and Eichhorn).

707. Hippotion brennus.

Sphinx brennus Stoll, in Cramer, *Pap. Exot.* iv. p. 233. t. 398 f. n (1782) (Amboina).
Amphion brennus, Hübner, *Verz. bek. Schm.* p. 185 n. 1445 (1822).
Chaerocampa brennus, Walker, *List Lep. Ins. B. M.* viii. p. 144. n. 29 (1856) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 566. n. 74 (1877) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 108. n. 207 (1888) ; id., in Chun, *Zoologica* xii. 29. p. 11. n. 5 (1900) (Ralum, vi.).
Chaerocampa brennus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 248. n. 29 (1875) (Aru).
Theretra brennus, Kirby, *Cat. Lep. Het.* i. p. 659. n. 111 (1892).

♂♀. This is a variable insect. The markings of the forewing are often very prominent, while in other individuals the lines are vestigial and the median band widened, being straight proximally and gradually shading off distally ; the postdiscal interspaces R^2—SM^2 are not rarely rufous. The base of the hindwing is sometimes blackish. The genital armature varies in detail, but this variation does not correspond to that of the wings. Extreme individuals have the appearance of belonging to distinct species. The variation is not local. However, there is a form in Queensland which we have not seen from other localities. This form is rather pale, has the forewing sharply marked, does not possess a white mesial stripe on the thorax, and has the white lateral stripe of the head and thorax shaded with vinaceous ; in structure it agrees with the form which has the white mesial stripe of the thorax. The two forms occur together in Queensland ; they have been bred, but nothing is published of the larvae as far as we are aware ; and both have been sent to this country as *johanna* by the collector who bred them.

We have only one bad specimen from Amboina, the locality where the type of *brennus* came from. Stoll's figure shows a distinct white mesial stripe on the pronotum. In somewhat rubbed specimens the stripe is indeed apparently confined to the pronotum, while it is continued on to the mesonotum in good individuals.

♂. Sexual armature not very obviously different from that of *rafflesi*, but there are very few teeth on the left side of the penis-sheath, sometimes none : the tooth on the right side is small or prominent according to individuals.

♀. Sides of vaginal aperture slightly raised.

Early stages not known.

a'. H. brennus f. *brennus.*

Sphinx brennus Stoll, *l.c.*

♂ ♀. Thorax with white mesial stripe.

b'. H. brennus f. *johanna.*

**Chaerocampa johanna* Kirby, *Trans. Zool. Soc. Lond.* p. 241 (1877) (Brisbane ;—Mus. Dublin) ; Waterh., *Ad Ident. Ins.* i. t. 38 (1881).
Pamora joanna (!), Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 9. n. 12 (1891).
Panacra maculiventris id., *l.c.*
Theretra johanna Kirby, *Cat. Lep. Het.* i. p. 659. n. 110 (1892).
Miacia johanna id., Allen, *Natur. Libr., Moths* iv. p. 25. t. 100. f. 3 (1897).

♂ ♀. Thorax without white mesial stripe.

Hab. Papuan Subregion : Southern Moluccas ; N. Guinea ; Bismarck Archipelago ; Queensland.

In the Tring Museum :

f. *brennus*, 12 ♂♂, 6 ♀♀ from : Queensland : Milne Bay, Brit. N. Guinea, xii. ii. (Meek) : Fergusson, ix.—xii. (Meek) ; Kapaur, ii. (Doherty) ; Ron I., Geelvink Bay, vii. (Doherty) ; Amboina, viii. (Doherty) ; Bongu, Germ. N. Guinea, xii. i. ; Florida I., Solomon Is., i. (Meek & Eichhorn).

f. *johanna*, 7 ♂♂, 5 ♀♀ from : Queensland.

708. Hippotion scrofa.

**Deilephila scrofa* Boisduval, *Voy. Astrol., Lép.* p. 185. n. 3 (1832) (Austral. :—Mus. Paris).
Chaerocampa scrofa, Walker, *List Lep. Ins. B. M.* viii. p. 147. n. 35 (1856) (Austral.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 566. n. 72 (1877) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 14. n. 21 (1891) (= *ignea*) (Tasmania ; South Austral. ; Victoria : Newcastle : Brisbane ; Rockhampton) : Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 16. n. 62 (1892).
Deilephila porcia Wallengren. *Wien. Ent. Mon.* iv. p. 42 (1860) ; id., *Lepid. Resa* p. 362 (1864).
Chaerocampa bernardus Koch, *Indo-Austr. Lep. Fauna* p. 53 (1865) (= *scrofa* from India ! —this spec. or. *boerhaviae?*) : Misk., *l.c.* (1891).
Chaerocampa scrofa Boisduval, *Spec. Gén. Lép. Hét.* i. p. 235 n. 14 (1875).
**Chaerocampa ignea* Butler, *Proc. Zool. Soc. Lond.* p. 10. n. 19. t. 1. f. 4 (1875) (Moreton Bay ; — Brit. Mus.) : id., *Trans. Zool. Soc. Lond.* ix. p. 566 n. 73 (1875) : Rothsch., *Nov. Zool.* i. p. 75 (1894) (not distinct).
Theretra scrofa, Kirby, *Cat. Lep. Het.* i. p. 659. n. 108 (1892).
Theretra ignea, id., *l.c.* n. 109 (1892).

♂ ♀ As in the allied species there occur brighter and paler specimens of either sex ; the ♀♀ are as a rule brighter than the ♂♂. The lines of the forewing are generally absent, except the oblique apical one, which is seldom faint ; sometimes there are three or four lines vestigial.

♂. Tenth segment resembling that of *cson* : tergite rounded at tip, not sinuate ; sternite narrow, elongate triangular, obtuse at end. Process of harpe

rather stouter than in *eson*, of nearly the same form. Penis-sheath (Pl. LVII. f. 33) : a row of teeth transversely over the sheath, ending in a dentate ridge on the right side, the row curved and oblique.

♀. Vaginal aperture more distal than in *eson*, with slightly raised semicircular edge.

Early stages not known.

Hab. Australia : Tasmania to Queensland.

In the Tring Museum 50-odd specimens from : Mackay, Queensland ; Dawson R. ; Brisbane ; Adelaide ; Victoria.

709. Hippotion balsaminae.

**Chaerocampa balsaminae* Walker, *List Lep. Ins. B. M.* viii. p. 138. n. 18 (1856) (Natal ;—Mus. Brit.) ; Guér., in Vins., *Voy. Madag.* p. 29 (1865) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 560. n. 33 (1877) ; Mab., *Ann. Soc. Ent. France* p. 299 (1879) ; Saalm., *Lep. Madag.* p. 123. n. 291 (1884) (Nossi-bé) ; Druce, in Moloney, *W. Afr. Forestry* p. 493. n. 7 (1887) ; Holl., *Trans. Amer. Ent. Soc.* xvi. p. 63. n. 17 (1889) (Benita) ; Fawc., *Trans. Zool. Soc. Lond.* xv. p. 309. n. 12. t. 48. f. 1, 2 (*l., p.*) (1901).

Chaerocampa balsaminae, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 252. n. 34 (1875).

Theretra balsaminae, Kirby, *Cat. Lep. Het.* i. p. 654. n. 46 (1892) ; Pagenst., *Jahrb. Wiss. Anst. Hamburg* x. 2. p. 37. n. 101 (1893) (Quilimane, 19. i. 93).

♂♀. Both wings narrow, sharply pointed. Striping of forewing resembling that of *H. eson* and *H. boerhaviae* ; first and second line forming a band, line 5 generally accentuated by vein-dots. Hindwing blackish from base to disc : then clayish, margin again brown, this marginal band narrow and rather sharply defined. Underside of wings somewhat more yellowish than upper, sometimes with distinct reddish tint.

♂. Tenth tergite sharply sinuate, the lobes acute : sternite gradually narrowed, ending in an acute hook. Process of harpe horizontal, slightly ∿-shaped, rather stout, dilated at end and here somewhat concave on the upperside. Penis-sheath (Pl. LVII. f. 30) with a curved series of teeth on the right side and one or two teeth on the left.

Larva green ; with a brown dorsal mesial line, interrupted, and green on thoracic segment ; a black ocellus on fourth segment, a red one on fifth, both with white ring.—Food-plant : *Jussieua*.

Tongue-case of pupa prominent ; cremaster short, pointed, with dentate.

Hab. Aethiopian Region.

In the Tring Museum 60-odd specimens from : Sierra Leone ; Gold Coast ; Niger : Toro and Uganda (Ansorge) ; British and German E. Africa : Nyassaland ; Delagoa Bay ; Natal ; Madagascar.

710. Hippotion saclavorum (Pl. V. f. 9, ♂).

**Deilephila saclavorum* Boisduval, *Faune Madag. Bourb.* p. 71. n. 1. t. 10. f. 6 (1833) (Madag. ;—coll. Charles Oberthür).

Chaerocampa saclavorum id., *Spec. Gén. Lép. Hét.* i. p. 251. n. 33 (1875).

Chaerocampa saclavorum, Butler, *Trans. Zool. Soc. Lond.* ix. p. 558. n. 27 (1877) : Mab., *Ann. Soc. Ent. France* p. 298 (1879).

Theretra saclavorum, Kirby, *Cat. Lep. Het.* i. p. 651. n. 17 (1892).

♂♀. Body and forewing above clayish isabella-colour : abdomen yellowish at sides, except on basal segments. Underside of body almost white.——Forewing, *above*, with three faint discal lines followed by a heavier double line which ends at tip of wing ; between it and outer margin traces of two more lines.——Hindwing

blackish brown, isabella-colour at anal angle.——*Underside* of wings clay-colour, forewing brown from base to first discal line.

♂. Tenth abdominal tergite rather stout, feebly sinuate; sternite broad and short, rounded at end, but mesially produced into a point. Process of harpe long, subcylindrical, pointed, horizontal, feebly curved dorsad at end. Penis-sheath with a slender process on each side, the left one dentate at the distal and proximal edges, the right one only at the distal edge (Pl. LVII. f. 32).

Early stages not known.

Hab. Madagascar.

In the Tring Museum 2 ♂♂ from Madagascar.

711. **Hippotion batschi** (Pl. V. f. 10, ♂).

Chaerocampa batschi Keferstein, *Jahrb. Ak. Erfurt* (2). vi. p. 14. t. 2. f. 4 (1878) (Tamatave); Mab., *Ann. Soc. Ent. France* p. 299 (1879); Saalm., *Lep. Madag.* p. 122. n. 281 (1884).
Chaerocampa? batschi, Butler, *Trans. Zool. Soc. Lond.* ix. p. 567. n. 79 (1877).
**Chaerocampa humilis* id., *Ann. Mag. N. H.* (5). iv. p. 234. n. 18 (1879) (Madagascar;—Mus. Brit.); Saalm., *l.c.* n. 282 (1884).
Metopsilus batschi, Kirby, *Cat. Lep. Het.* i. p. 660. n. 4 (1892).
Metopsilus humilis, id., *l.c.* n. 5 (1892).

The type of *humilis* is a discoloured specimen.

♂♀. Very close to *saclavorum*; perhaps not distinct. Abdomen without yellowish lateral area; underside russet-brown like upper, much darker than in *saclavorum*. Forewing with only one distinct line and this not quite so oblique as in that species. Sexual armature not different.

Hab. Madagascar.

In the Tring Museum 3 ♂♂, 1 ♀ from Madagascar, without special locality.

712. **Hippotion butleri.**

Panacra butleri Saalmüller, *Lep. Madag.* p. 118. n. 275. t. 5. f. 51 (♀) (1884) (Nossi-bé).
Metopsilus butleri, Kirby, *Cat. Lep. Het.* i. p. 660. n. 5 (1892).

♀. Not seen. According to figure, differing from *batschi* especially in the forewing having from apex to inner margin near angle an irregular whitish band which shades off proximally.

Hab. Nossi-bé: 1 ♀ in Mus. Frankfurt a/M.

713. **Hippotion roseipennis** Pl. V. f. 11, ♂).

**Diodosida roseipennis* Butler, *Ann. Mag. N. H.* (5). x. p. 433. n. 3 (1882) (Delagoa Bay;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 642. n. 9 (1892).

♂♀. Head and thorax without pale lateral stripe. External row of spines of foretibia double. Antenna obviously clubbed in both sexes. Wings similar in shape and pattern to those of *batschi* and *saclavorum*; but prominent discal line of forewing more curved, more distal behind, and hindwing with a pale submarginal band from anal angle to near costa nearly as in *balsaminae*. The tropical specimens have the pale band of the hindwing rather broader than those from Delagoa Bay.

♂. Tenth tergite rounded-pointed, not sinuate; sternite broad, rounded-truncate, distinctly incised mesially. Process of harpe rather short, stout, little curved, compressed at end. Penis-sheath (Pl. LVII. f. 31): one or two small subapical teeth on the left side, a pointed, triangular, apical process on the right.

Early stages not known.

Hab. East Africa: from Delagoa Bay to British East Africa.

In the Tring Museum 4 ♂♂, 2 ♀♀ from: Delagoa B. (Monteiro); Ft. Johnston, Brit. C. A. (Dr. Rendall); Uluguru, Germ. E. Afr.; Mombasa, x. (Dr. Ansorge).

714. Hippotion rosae.

**Daraxa rosae* Butler, *Ann. Mag. N. H.* (5). x. p. 433. n. 5 (1882) (Delagoa B.;—Mus. Brit.).
Metopsilus rosae, Kirby, *Cat. Lep. Het.* i. p. 660. n. 9 (1892).

♀. A broad-winged and large species, easily recognised by the pink antenna and the whitish grey upperside of body and forewing. Black stigma of forewing prominent; a patch of blackish and brown speckles at inner margin. Body stout. Palpus simple, second segment as broad as long, truncate. External spur of midtibia considerably shorter than inner one. Antenna clubbed, short for such a large species.

Early stages not known.

Hab. Delagoa Bay.

In the Tring Museum 2 ♀♀ from Delagoa Bay (Monteiro).

715. Hippotion rebeli spec. nov. (Pl. V. f. 12, ♀).

♂♀. Antenna rather strongly clubbed in ♀. Body above clay-colour, underside creamy buff, no markings.

Wings, *upperside*, clayish buff, hindwing faintly pinkish.——Forewing: speckled with brown, a faint brown transverse line at base of M^2; a clayish cinnamon patch just beyond apex of cell, another at inner margin close to outer angle, bordered proximally by a vestigial line, a short postdiscal band between SC^5 and R^3, and a short blackish oblique apical dash; a minute black stigma.——Hindwing: an indistinct border of brown speckles.

Underside buff, hindwing a little paler than forewing, both speckled with brown; no markings, except a short apical dash and the vestige of a line midway between subcostal fork and apex of forewing, and a faint brown border to the hindwing.

♂. Tenth tergite slender, convex above, apex acuminate; sternite with almost parallel sides, rounded at end, with a small mesial incision. Clasper with *one* large friction-scale; harpe ending in a broad asymmetrical process (Pl. LII. f. 22). Penis-sheath armed with one conical pointed process which projects towards the right side (Pl. LVII. f. 38).

Early stages not known.

Hab. N.E. Africa: Sudan; Obock.

In the Hofmuseum in Wien 1 ♀ (*type*, figured) from Bahr-el-Seraf, Sudan; a ♂ in the Museum in Paris from Obock.

This Obock ♂ has the forewing less distinctly marked, but it shows better than the ♀ that the line on the disc and that before inner margin are portions of one discal line.

716. Hippotion irregularis.

**Pergesa irregularis* Walker, *List Lep. Ins. B. M.* viii. p. 152. n. 4 (1856) (W. Afr.;—Mus. Brit.): Butl., *Trans. Zool. Soc. Lond.* ix. p. 548. n. 4 (1877).
Chaerocampa? irregularis, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 283. n. 82 (1875).
Chaerocampa irregularis, Holland, *Trans. Amer. Ent. Soc.* xvi. p. 65. n. 18. t. 3. f. 3 (1889).
Chaerocampa irregularis, Karsch, *Ent. Nachr.* xvii. p. 294. n. 7 (1891) (Cameroons).
Metopsilus irregularis, Kirby, *Cat. Lep. Het.* i. p. 661. n. 10 (1892).
**Theretra crossei* Rothschild iii. p. 22. n. 3 (1896) (Assaba;—Mus. Tring).

♂ ♀. Opening of palpus sharply defined, the scaling bordering it very regular. External rows of spines of first protarsal segment doubled and trebled. Lines 2 and 4 of forewing generally absent, sometimes vestigial, line 5 represented by vein-dots, closely followed by 6, which ends at tip of wing, lines 7 and 8 not marked: a brown postdiscal cloud between R^2 and R^3. The brown marginal border of the underside of the forewing joined along R^2 to the brown basal area: a series of prominent discal dots over both wings.

♂. Tenth abdominal tergite rather broad, little narrowed to end, concave below, convex above. apex rounded, slightly sinuate: sternite narrow, curving upwards, pointed, forming a hook. Clasper with four large friction-scales; harpe (Pl. LII. f. 17) with two heavily chitinised processes shaped like ox-horns, one horizontal, the other vertical. Penis-sheath (Pl. LVIII. f. 13) with a single and rather heavy subapical tooth.

Early stages not known.

Hab. West Africa.

In the Tring Museum 4 ♂♂, 1 ♀ from the Niger: Warri, vi. (Dr. Roth); Agheri, vii. (Dr. Ansorge); Assaba (Dr. Cross); Ogrugu: also 1 ♂ from the Congo (Bentley).

CLXII. THERETRA.—Typus: *nessus*.

Sphinx Linné, *Syst. Nat.* ed. x. p. 489 (1758) (partim; type: *ocellata*).
Theretra Hübner, *Verz. bek. Schm.* p. 135 (1822) (partim; type: *nessus* = *equestris*).
Isoples id., *l.c.* (1822) (partim; type: *cson*).
Xylophanes id., *l.c.* (1822) (partim; type: *anubus*).
Orcus id., *l.c.* p. 136 (1822) (partim; type: *guoma*).
Thaumas id., *l.c.* p. 138 (1822) (partim; type: *respertilio*).
Deilephila, Stephens (*non* Laspeyres, 1809), *Illustr. Brit. Ent., Haust.* i. p. 123 (1829) (partim).
Choerocampa Duponchel, in God., *Pap. France, Suppl.* ii. p. 159 (1835) (partim; type: *nerii*).
Darapsa Walker, *List Lep. Ins. B. M.* viii. p. 182 (1856) (partim: type: *choerilus*).
Gnathostypsis Wallengren, *Oefv. Vet. Ak. Förh.* xv. p. 137 (1858) (type: *capensis*).
Perycsa, Moore (*non* Walker, 1856), *Proc. Zool. Soc. Lond.* p. 566 (1872).
Panacra, Butler (*non* Walker, 1856), *Trans. Zool. Soc. Lond.* ix. p. 550 (1877) (partim).
Hathia Moore, *Lep. Ceylon* ii. p. 19 (1882) (type: *latreillei*).
Gnathothlibus, id. (*non* Wallengren, 1858), *l.c.* p. 21 (1882).
Metopsilus, Kirby (*non* Duncan, 1836), *Cat. Lep. Het.* i. p. 660 (1892) (partim).

♂ ♀. Second segment of palpus on innerside with apical tuft of scales directed ventrad (Pl. LIX. f. 27); apex of first segment densely and regularly scaled on innerside, with cavity at apex on outerside (Pl. LIX. f. 16).

Larva strongly tapering in front, one or more ocelli.

Pupa with strongly compressed and prominent tongue-case.

Hab. Oriental and Aethiopian Regions, a few species northward to Japan, two ranging to the Caspian Sea and Constantinople respectively.

Twenty-nine species.

Key to the species:

a. Hindwing red . . . . . *b*.
Hindwing not red, or only with a narrow, ill-defined, reddish tawny band . . . . . *c*.

b. Base of hindwing black . . . . . *c*.
Base of hindwing red like disc . . . . *d*.

c. Thorax with grey middle stripe; abdomen without black basal side-patch . . . . . 731. *Th. suffusa.*

Thorax without grey middle stripe: abdomen with black basal side-patch . . . . . 730. *Th. alecto.*

d. Cavity at end of first segment of palpus regularly defined, thorax without mesial stripe . . . 729. *Th. capensis.*

Cavity at end of first segment of palpus not sharply defined, thorax with white middle stripe . . 744. *Th. pallicosta.*

e. Abdomen above with lines, or with a dorso-lateral tawny-ochraceous or ochreous stripe beginning on segment 3; no obvious black basal side-patch . . . . . *f*.

Abdomen without dorsal lines, or with black basi-lateral patch, without yellowish dorso-lateral stripe. . . . *r*.

f. Cavity of palpus large and sharply defined . . . . . *g*.

Cavity of palpus more or less concealed or rendered irregular by rough scaling . . . . . *i*.

g. A large species, with broad ochreous dorso-lateral stripe on abdomen . 717. *Th. nessus.*

A small species, no such stripe on abdomen . . . . . 743. *Th. orpheus.*

i. Forewing with a broad grey submarginal band . . . . 742. *Th. griseomarginata.*

Forewing without such a band . . . . *j*.

j. Stigma of forewing isolated, followed by a dark straight oblique band which consists of two or three distinct lines . . . . . *l*.

Stigma situated in a black or brown patch, which is not very distinct; the discal band is curved, or indistinct except at internal margin, where it forms a square patch together with an antemedian band, or wings nearly all brown . . . . *k*.

k. Discal band of forewing above forming three black contiguous patches between SC^5 and R^3; the pale interspace distally of it narrow and sharply marked: mesothoracic tegula with pale middle stripe . 741. *Th. insignis.*

Discal band of forewing distinct only behind, where it forms a square patch, interspace distally of it dull grey like base of wing; mesothoracic tegula with pale middle stripe . 740. *Th. turneri.*

Mesothoracic tegula without pale middle stripe . . . . . 739. *Th. brunnea.*

l. Pale mesial line of abdomen simple, white . . . . . *m.*

Pale mesial line of abdomen (white-grey or clayish) more or less completely separated into two lines . . *n.*

m. Discal interspace of forewing silvery white . . . . . 738. *Th. margarita.*

Discal interspace of forewing clayish . 737. *Th. pinastrina.*

n. Blackish brown discal band of forewing consisting of lines 1, 2, and 3, the last heavier than line 2 . . . . *o.*

The band consisting of lines 1 and 2, line 3 standing separate and not being so heavy as line 2, especially behind . . . . . *p.*

o. Hindwing above with a blackish olive discal line ; abdomen with a dorso-lateral stripe of irregular white scaling (not at base) . . . 735. *Th. cajus.*

Hindwing above without a distinct discal line; abdomen with ochraceous lateral stripe . . . 736. *Th. oldenlandiae.*

p. Middle line of mesothoracic tegula buffish grey ; forewing with a brown triangular spot at inner margin near anal angle. Africa . 734. *Th. monteironis.*

Middle line of tegula tawny ; forewing without that spot. Oriental Region . . . . . *q.*

q. Line 4 of forewing curving basad behind, pale band of hindwing clayish buff . . . . . 732. *Th. japonica.*

Line 4 of forewing straight, very heavy, pale band of hindwing reddish . . . . . 733. *Th. lycetus.*

r. Cavity at end of first segment of palpus partly concealed by rough scaling . . . . . *s.*

Cavity at end of first segment of palpus sharply defined . . . . *t.*

s. Body above olive-chestnut, below ferruginous or red . . . . 745. *Th. castanea.*

Body above drab, below buff or vinaceous buff . . . . 726. *Th. latreillei.*
t. Thorax without pale lateral stripe . . . . *u.*
Thorax with pale lateral stripe . . . . *r.*
u. Forewing below with a distinct drab-grey dentate marginal band; fringe unicolorous. Africa . . . . 728. *Th. jugurtha.*
Forewing below without a distinct marginal band: fringe spotted. Papuasia . . . . . 727. *Th. tryoni.*
r. Wings and body vinaceous red . . 723. *Th. incarnata.*
Wings and body not vinaceous red . . . *w.*
w. Forewing below without vestige of lines 725. *Th. inornata.*
Forewing below at least with a costal spot about 10 mm. from apex representing a discal line . . . . *x.*
x. Forewing with a single broad line measuring about 2 mm. behind . 720. *Th. queenslandi.*
Forewing with one, thin, or more lines . . *y.*
y. Forewing above with several discal lines: that ending at tip of wing accentuated by vein-dots . . 719. *Th. boisduvali.*
The line ending at tip of wing not accentuated by vein-dots, or the line curved towards costa; abdomen without dorsal lines . . . . *z.*
The line ending at tip of wing broad, not accentuated by vein-dots, the two preceding lines close together: abdomen striped above . . . 718. *Th. rhesus.*
z. Forewing below without traces of a line between cell and subapical costal spot . . . . . 724. *Th. indistincta.*
Forewing below with traces of a line between cell and subapical costal spot . . . . . *a'.*
a'. Apical line of forewing joining a distal line with which it forms a single line running from tip to inner margin . . . . . 721. *Th. clotho.*
Apical line, if present, separate from the respective discal line, which curves towards costal margin . 722. *Th. gnoma.*

717. Theretra nessus.

Sphinx nessus Drury, *Illustr. Ex. Ins.* ii. p. 16. t. 76. f. 1 & *Index* (1773) (Madras); Cram., *Pap. Exot.* iii. p. 58. t. 226. f. b (1779) (Java); Goeze, *Ent. Beytr.* iii. 2. p. 218. n. 18 (1780).
Sphinx equestris Fabricius, *Ent. Syst.* iii. 1. p. 365. n. 29 (1793) (Ind. or.); Auriv., *Ent. Tidskr.* xviii. p. 152. n. 80 (1897) (= *nessus*).

Theretra equestris, Hübner, *Verz. bek. Schm.* p. 135. n. 1446 (1822).

Chaerocampa nessus, Walker, *List Lep. Ins. B. M.* viii. p. 140. n. 22 (1856) (Canara ; Ceylon ; Silhet ; Hongkong ; Java) ; Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 276. n. 640. t. 11. f. 2. 2a (*l., p.*) (1857) (Java) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 565. n. 71 (1877) ; Moore, *Proc. Zool. Soc. Lond.* p. 595 (1877) (Pt. Blair) ; Butl., *ibid.* p. 613. n. 54 (1881) (Belgaum, x.) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 19. n. 105 (1887) ; Swinh., *Journ. Bombay N. H. Soc.* iii. p. 118. n. 9 (1888) (Karachi, x.) ; Leech, *Proc. Zool. Soc. Lond.* p. 584. n. 16 (1888) (Yokohama) ; Swinh., *Trans. Ent. Soc. Lond.* p. 164. n. 17 (1890) (Moulmein) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xliii. p 101. n. 179 (1890) (E. Java) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 15. n. 23 (1891) (Brisbane) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 18. n. 69 (1892) ; Piep., *Tijdschr. Ent.* xl. p. 98. t. 1. f. 13. 14 (horn of *l.*) (1897).

Chaerocampa nessus var. *rubicundus* Schaufuss, *Nunq. Otios.* i. p. 18 (1870) (Java).

Chaerocampa equestris, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 260. n. 45 (1875).

Pergesa nessus, Snellen, *Tijdschr. Ent.* xx. p. 2. n. 10 (1877) (Java).

Chaerocampa equestris, id., *l.c.* xxii. p. 67. n. 18 (1877) (S. Celebes) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 108. n. 210 (1888) (Amboina).

Theretra nessus, Moore, *Lep. Ceylon* ii. p. 22. t. 86. f. 1 (1882); Kirby, *Cat. Lep. Het.* i. p. 659. n. 107 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 99. n. 157. fig. 56 (1892) ; Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 28 (1895) (Java) ; Semp., *Schm. Philipp.* ii. p. 401. n. 45. t. c. f. 1. 2. 3 (*l., p.*) (1896) (Luzon ; Mindanao ; Palawan ; Penlan ; ii. vii.—ix. xi) ; Pagenst., *Abh. Senk. Nat. Ges.* xxiii. p. 444. n. 425 (1897) (Celebes) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 412. n. 157 (1898) (Sikhim ; Bhutan, 2000 ft.; vi.—viii. ; *l. & p.* descr.) ; Leech, *Trans. Ent Soc. Lond.* p. 286. n. 60 (1898) (Yokohama ; Kinshiu).

Chaerocampa nessus, Swinhoe, *Proc. Zool. Soc. Lond.* p. 514. n. 5 (1884) (Karachi) ; id., *l.c.* p. 288. n. 10 (1885) (Belgaum ; Bombay, ix.—xi.).

♂♀. Second segment of palpus more triangular than in the allied species of *Theretra*, the opening of the palpus large, some single long scales protruding from it. External row of spines of first protarsal segment doubled and trebled. The lines on the forewing, above and below, are rather variable in detail ; the first discal line of the underside is generally thinner and more obviously dentate in the Japanese, Chinese and Indian specimens than in the individuals from the Malayan and Papuan Subregions. The dirty yellowish buff area of the hindwing is often very much reduced in length as well as in width. The dorsal area of the abdomen shows vestiges of lines.

♂. Tenth tergite of the usual type, sinuate ; sternite slightly spatulate, rounded at end. Clasper with 20-odd large scales ; harpe (Pl. LII. f. 21) peculiar, very stout, short, curved at end, the upperside somewhat concave, the externo-dorsal edge of the upperside irregularly notched, raised proximally into a broad, compressed tooth, tip of harpe acute in side-view, obtuse in subproximal view. Penis-sheath (Pl. LVIII. f. 14) armed with an elongate kidney-shaped, multidentate, apical lobe.

♀. Edge of vaginal cavity not obviously raised to a ridge.

Larva with rather small ocellus on fourth segment, followed by a still smaller spot on fifth segment ; a pale dorso-lateral stripe from head to horn, area beneath this stripe with oblique bands or stripes.—Food-plants : *Dioscorea* ; *Barringtonia Hub.* Oriental Region : Ceylon, N.W. India to Japan, eastwards to Lifu.

In the Tring Museum 100-odd specimens from : Ceylon ; Bombay ; Khasia Hills ; Sikhim ; Buxa, Bhutan ; Yokohama, vii. viii. ; Kanagawe near Tokio, v. ; Malay Pen. ; Borneo ; Sumatra : Nias ; Java : Lombok ; Alor ; Tenimber ; Amboina ; Dutch, German, and British N. Guinea ; Louisiade Is. ; d'Entrecasteaux Is. ; Trobriand Is. ; Queensland ; Lifu.

718. Theretra rhesus.

**Chaerocampa rhesus* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 254. n. 36 (1875) (Philippines ;—coll. Charles Oberthür).

Chaerocampa lucasi, Snellen (*non* Walker, 1856), *Tijdschr. Ent.* xxii. p. 66. n. 16 (1877) (partim ; S. Celebes).

**Chaerocampa insularis* Swinhoe, *Cat. Lep. Het. Mus. Oc.* i. p. 18. n. 71 (1892) (Ceram ; Key ;—Mus. Oxford).

Theretra rhesus, Kirby, *Cat. Lep. Het.* i. p. 656. n. 70 (1892) ; Semp., *Schm. Philipp.* ii. p. 402. n. 46. t. 52. f. 2 (1896) (Luzon ; Cebu).

**Theretra javanica* Rothschild, Nov. Zool. i. p. 76 (1894) (Java :—Mus. Tring).

Theretra insularis, Kirby, *ibid.* p. 101. n. 75 a (1894).

Theretra cyrene, Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 25 (1895) (Java).

♂ ♀. Agrees closely with heavily marked specimens of *boisduvali* ; the lines on the abdomen are more distinct and those on the forewing much heavier, especially line 4 ; lines 2 and 3 stand close together, 3 being wider separated from 4 than in *boisduvali*. Structurally not different from *clotho* and *boisduvali*.

Larva agreeing with that of *nessus*, according to Semper.

Hab. Oriental Region, from Sumatra eastwards to the Solomon Islands.

In the Tring Museum 1 ♂, 8 ♀♀ from : Benkoelen, W. Sumatra (Ericsson) ; S. Java, 1500 ft. (Fruhstorfer) ; Little Key, ii. '94 (Kühn) : Fergusson, d'Entrecasteaux Is., xi. '94 (Meek) ; Treasury I., Solomon Is., viii. 1901 (Meek and Eichhorn).

719. Theretra boisduvali.

**Sphinx cretica* Boisduval, *Ann. Soc. Linn. Paris* vi. p. 118 (1827) (partim ; " ♂ " ;—coll. Charles Oberthür) ; Herr.-Sch., *Schm. Eur.* ii. p. 85. f. 6 (1844).

Deilephila cretica Boisduval, *Icon. Hist. Lép.* p. 20. t. 49. f. 2 (1834).

Sphinx boisduvali Bugnion, *Ann. Soc. Ent. France* p. 115 (1839) (nom. nov. pro ♂ Boisd. *creticae*).

Chaerocampa cretica, Walker, *List Lep. Ins. B. M.* viii. p. 130. n. 4 (1856) (cit. partim).

Deilephila boisduvali, Staudinger & Wocke, *Cat. Lep.* ed. ii. p. 37. n. 475 (1871) ; Bartel, in Ruhl, *Grossschm.* ii. p. 112 (1900).

Choerocampa clotho, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 253. n. 35 (1875) (partim).

**Chaerocampa punctivenata* Butler, *Proc. Zool. Soc. Lond.* p. 248. n. 27 (1875) (Masuri ; Silhet ; Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 562. n. 41 (1877) ; Swinh., *Proc. Zool. Soc. Lond.* p. 288. n. 18 (1885) (Bombay, vii. viii.).

Chaerocampa boisduvali, id., *l.c.* p. 558. n. 24 (1877).

Chaerocampa lucas, Hampson (*non* Cramer, 1777), in Blanf., *Fauna Brit. Ind., Moths* i. p. 93. n. 141. (1892) (partim) : Dudg., *Journ. Bombay N. H. Soc.* xi. p. 412. n. 141 (1898) (partim : Sikhim : Bhutan).

Theretra boisduvali, Kirby, *Cat. Lep. Het.* i. p. 654. n. 48 (1892).

Theretra punctivenata, id., *l.c.* p. 656. n. 68 (1892).

Chaerocampa (?) boisduvali, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 103. n. 758 (1901).

This is the species of which Boisduval considered in 1827 a specimen to be the ♂ of his *cretica* ; Boisduval's figure of this ♂ is not correct.

♂ ♀. Black dots at stigmata of abdomen distinct. Forewing with six lines, line 4 accentuated by vein-dots. Abdomen mostly with five dorsal lines, which are seldom quite absent, the middle one the feeblest. The buff patch on the hindwing always reduced in size, never larger than in ordinary Indian *clotho*.

Larva not known with certainty.

Hab. Ceylon to North India, westward to Asia Minor and Turkey (straggler), eastward to Borneo and Lombok.

In the Tring Museum 7 ♂♂, 5 ♀♀ from : Sikhim, vii. viii. (Pilcher) ; Khasia Hills ; Benkoelen, W. Sumatra, (Ericsson) ; Mt. Gede, Java, 4000 ft. (Fruhstorfer) ; Lombok, vi. (Everett) ; N. Borneo.

720. Theretra queenslandi.

Chaerocampa queenslandi Lucas, *Queenslander* xxxix. p. 894 (1891) (Brisbane).
(?) *Chaerocampa clotho*, Miskin (*non* Drury, 1773), *Proc. Roy. Soc. Queensld.* viii. p. 15. n. 24 (1891) (partim).
**Chaerocampa potentia* Druce, *Ann. Mag. N. H.* (6) xiii. p. 169 (1894) ("Mexico" *loci error*;—coll. Staudinger) : id., in *Biol. Centr. Amer., Lep. Het. Suppl.* p. 306. n. 13. t. 66. f. 5 (♀) (1896) ("Mexico" *loci error*).

The *type* of *potentia* in coll. Staudinger came from coll. Sommer, and was without locality ; unfortunately Staudinger labelled it "Mexico ?" and thus misled Druce to describe it as an American insect. We append the following description.

♂ ♀. Resembling Indian *clotho* ; mesothoracic tegulae darker than notum, the whitish lateral border continued to tip of palpus ; abdomen basi-laterally with an olive-brown patch which is continued as an indistinct band, gradually fading away on segments 4 and 5. Scaling of antenna pinkish.

Wings, *above*.——Forewing : costal edge pinkish ochraceous, costal area from base to beyond middle like tegula, a broad line of the same colour from apex of wing to middle of hinder margin, extending along the latter to near base, not quite reaching an indistinct black basal patch, the line feebly curved on disc, more obviously at apex, externally shading off ; stigma distinct ; marginal and apical areas dusted with black scales.——Hindwing black, abdominal margin and a patch before SM^2 creamy buff, marginal area also pale, but much dusted with black ; fringe pinkish buff.

Underside pinkish buff, hindwing rather more pinkish than forewing, both wings much sprinkled with black scales.——Forewing : basal half brown, except costal area, the line of the upperside vestigial apically, a series of minute discal dots, costal one heavier, about 9 mm. from tip of wing.——Hindwing : a discal series of indistinct vein-dots, parallel to margin, curving costad in front ; costal margin more, abdominal area less speckled with olive than disc.

♂ not dissected.

Early stages not known.

Hab. Queensland.

In the Tring Museum 3 ♀♀ from : Brisbane.

A ♂ and a ♀ in the collection of Dr. Turner at Brisbane.

721. Theretra clotho.

Sphinx clotho Drury, *Illustr. Ex. Ins.* ii. p. 48. t. 28. f. 1 & *Index* (1773) (Madras).

♂ ♀. A widely distributed and rather variable insect.——Forewing above with a conspicuous line ending at tip of wing—this line consisting of the oblique apical line with which a discal line is merged together. In Drury's figure the line is too heavy. The stigmatical dots of the abdomen are obsolete, only the dot at the stigma of the third segment being distinctly black.

♂. Sexual organs similar to those of *indistincta*. Tenth tergite sinuate : sternite pointed. Friction-scales of clasper numerous and narrow ; harpe without free process, truncate, dorsal edge more or less notched. Patch of teeth on penis-sheath (Pl. LVIII. f. 7) long, the teeth pointing proximad ; the central point of each tooth much longer than the lateral ones and curved (Pl. LVIII. f. 8).

Larva : green or brown, one large ocellus on fourth segment, followed by six small blind ocelli.—Food-plant : *Cissus*.

Hab. Oriental Region: from Ceylon and N.W. India to Japan, eastwards to the Solomon Islands and New Caledonia.

Two subspecies:

a. Th. clotho clotho (Pl. XIV. f. 9, ♂).

Sphinx clotho Drury, *l.c.* (1773); Goeze, *Ent. Beytr.* iii. 2. p. 206. n. 9 (1780) (partim).
**Deilephila cyrene* Westwood, *Cab. Or. Ent.* p. 13. t. 6. f. 1 (1848) (C. Ind.; Ceylon;—Mus. Oxford).
Chaerocampa clotho, Walker, *List Lep. Ins. B. M.* viii. p. 141. n. 23 (1856) (partim): Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 277. n. 641 (1857) (Java; China; syn. partim); Feld., *Wien. Ent. Mon.* vi. p. 30. n. 32 (1862) (Ning-po); Moore, *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal): Semp., *Verh. Zool. Bot. Ges. Wien* xviii. p. 700. n. 14 (1867) (larva): Butl., *Trans. Zool. Soc. Lond.* ix. p. 561. n. 43 (1877): Snell., *Tijdschr. Ent.* xxii. p. 66. n. 15 (1877) S. Celebes); Swinh., *Proc. Zool. Soc. Lond.* p. 289. n. 15 (1885) (Bombay, viii.—x.: Belgaum); Cot. & Swin., *Cat. Moths Ind.* i. p. 18. n. 98 (1887); Leech, *Proc. Zool. Soc. Lond.* p. 581. n. 13 (1888) (Satsuma, v.); Swinh., *Trans. Ent. Soc. Lond.* p. 164. n. 16 (1890) (Monlmein, Mandalay); id., *Cat. Lep. Het. Mus. Ox.* i. p. 20. n. 79 (1892) ("*butus*" excl); Semp., *Schm. Philipp.* ii. p. 399. n. 38. t. r. f. 8, 9 (*l., p.*) (1896) (Luzon; Bohol; Cebu; Palawan; viii.—xii.); Piep., *Tijdschr. Ent.* xl. p. 97. t. i. f. 11, 12 (horn of *l.*), p. 100. t. 3. f. 6–9 (*larva*) (1897) (Java); Leech, *Trans. Ent. Soc. Lond.* p. 284 n. 54 (1898) (syn. partim: Satsuma).
Chaerocampa clotho, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 253. n. 135 (1875) (partim).
**Chaerocampa listriguta* Butler, *Proc. Zool. Soc. Lond.* p. 249. n. 28 (1875) (Java:—Mus. Brit); id., *Trans. Zool. Soc. Lond.* ix. p. 562. n. 45 (1877).
Chaerocampa cyrene, id., *l.c.* ix. p. 561. n. 42 (1877) (Java).
**Chaerocampa aspersata* Kirby, *Trans. Ent. Soc. Lond.* p. 241 (1877) (Andamans;—Mus. Dublin); Waterh., *Aid Ident. Ins.* i. t. 97 (1882).
Hathia clotho, Moore, *Lep. Ceylon* ii. p. 20. t. 87. f. 1 (1882).
Theretra clotho, Kirby, *Cat. Lep. Het.* i. p. 655 n. 63 (1892) (syn. partim); Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 26 (1895) (Java).
Chaerocampa butus, Hampson (*non* Cramer, 1777), in Blanf., *Fauna Brit. Ind., Moths* i. p. 93 n. 141 (1892) (partim); id., *Illustr. Typ. Specim. Lep. Het.* p. 3. n. 42. t. 175. f. 10 (*l*) (1893); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 412. n. 141 (1898) (Sikhim, Bhutan, vi.—x., up to 4000 ft.: partim).

♂♀. Abdomen with black lateral patch at base. Buff band of hindwing abbreviated in front, not reaching further costad than R^3, the anterior part being more or less completely suppressed in consequence of the extension of the black scaling.

Hab. Ceylon and N.W. India to the Philippines, Celebes, and Timor.

In the Tring Museum 70-odd specimens from: Ceylon; South and North India; China; Malay Pen.; Andaman Is.; Sumatra; Borneo; Java; Lombok; Sumba; Dili, Timor; N. Celebes.

b. Th. clotho celata (Pl. XIV. f. 2, 3, ♂).

**Chaerocampa celata* Butler, *Proc. Zool. Soc. Lond.* p. 472 (1877) (C. York;—Mus. Brit.).
Chaerocampa luteotincta Lucas, *Queenslander* xxxix. p. 894 (1891) (Brisbane).
Chaerocampa cloacina Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 16. n. 26 (1891) (Brisbane; Cardwell).
Chaerocampa queenslandi, id. (*non* Lucas, 1891) *l.c.* p. 64 (1891).
Theretra celata, Kirby, *Cat. Lep. Het.* i. p. 655. n. 60 (1892).
Theretra cloacina, id., *l.c.* p. 656. n. 65 (1892).
**Theretra lifuensis* Rothschild, *Nov. Zool.* i. p. 78 (1894) (Lifu:—Mus. Tring).
Theretra queenslandi, Kirby, *ibid.* i. p. 101 (1894).

♂♀. On the whole more yellowish than *clotho clotho*. Abdomen without distinct black basal patch. Buff area of hindwing broad, more or less extended to costal margin, the black area being reduced. Blackish brown area of underside of forewing generally less extended than in the western form.

Hab. Papuan Subregion : Moluccas, eastwards to Australia and New Caledonia.

In the Tring Museum 11 ♂♂, 11 ♀♀ from : Mackay, Queensland ; Aroa R., British N. Guinea (Weiske); Daru I.; Fergusson and Trobriand (Meek); St. Aignan (Meek) ; Bongu, Huon Golfe ; Great Key ; Larat, Tenimber (Kühn) ; Amboina ; Ceram ; Tugela and Treasury, Solomon Is. ; Lifu.

Timor individuals and some from Sumba are intermediate between typical *celata* and typical *clotho*.

722. **Theretra gnoma** (Pl. XIV. f. 1, ♂).

Sphinx gnoma Fabricius, *Syst. Ent.* p. 546. n. 32 (1775) (India :—Mus. Kopenhagen) ; Goeze, *Ent. Beytr.* iii. 2. p. 208. n. 27 (1780) ; Fabr., *Spec. Ins.* ii. p. 152. n. 53 (1781) (= *butus*) ; id., *Mant. Ins.* ii. p. 97. n. 58 (1787) : Gmel., *Syst. Nat.* i. 5. p. 2384. n. 86 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 376. n. 61 (1793) (= *butus*!) ; Auriv., *Ent. Tidskr.* xviii. p. 153. n. 84 (1897) (= *butus* ; = "*clotho*" err.).

Sphinx butus Cramer, *Pap. Exot.* ii. p. 88. t. 152. f. A (1777) (Coromandel) ; Goeze, *l.c.* p. 221. n. 63 (1780).

Orcus gnoma, Hübner, *Verz. bek. Schm.* p. 136. n. 1461 (1822).

Chaerocampa clotho, Walker (*non* Drury, 1773), *List Lep. Ins. B. M.* viii. p. 23 (1856) (partim) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 561. n. 43 (1877) (partim).

Darapsa butus, Walker, *List Lep. Ins. B. M.* viii. p. 186. n. 7 (1856) (= *gnoma*).

Chaerocampa butus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 255. n. 38 (1875).

**Chaerocampa gonographa* Butler, *Proc. Zool. Soc. Lond.* p. 249. n. 29 (1875) (Bombay ; S. India ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 562. n. 46 (1877) ; Swinh., *Proc. Zool. Soc. Lond.* p. 288. n. 17 (1885) (Poona ; Belgaum ; Bombay) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 19. n. 101 (1887) (Poona ; Belgaum ; Bombay) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 20. n. 78 (1892) (Nilgiris ; Canara ; Bombay).

Chaerocampa butus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 561. n. 41 (1877) ; Hamps, in Blanf., *Fauna Brit. Ind., Moths* i. p. 93. n. 141 (1892) (partim).

Theretra gnoma Kirby, *Cat. Lep. Het.* i. p. 655. n. 59 (1892).

Theretra butus, id., *l.c.* n. 61 (1892) (= *gonographa*).

A photograph of the type of *gnoma* kindly sent to us by Dr. Meinert agrees with *butus* of Cramer.

♂♀. Paler than Indian specimens of *clotho*. Abdominal stigmata without black dots. Forewing with one discal line, which is almost parallel to the outer margin and curves costad at SC^5, being accentuated upon the veins and sometimes absent ; a second line often vestigial, situated nearer cell. The pale marginal area of the hindwing more extended than in *clotho clotho*, nearly as much as in *clotho celata*. We have not noticed any constant differences in the sexual armature between *gnoma* and *clotho*.

Early stages not known.

Hab. South India ; Ceylon.

In the Tring Museum 5 ♂♂, 5 ♀♀ from : Ceylon ; S. India.

723. **Theretra incarnata** spec. nov. (Pl. VI. f. 12, ♀).

♀. First protarsal segment with a simple external row of spines. Cavity of palpus as sharply defined as in *inornata*, *butus*, etc.

Body and wings rufous-testaceous, upperside much shaded with brown. The white lateral border of the thorax is continued to the tip of the palpus, but is not very distinct on the head.

Wings, *above*.——Forewing : basal half shaded with brown ; a black stigma ; a single black line (in one of the three specimens barely vestigial), about 5 mm. from outer margin at SC^5, a short apical line, separate or joining the discal line ; outer margin convex, fringe unicolorous.——Hindwing : the greater part brown,

the reddish colour appearing at anal angle and along outer margin, but not forming a band ; apex obtuse.

Underside : basal half of forewing clayish olive, rest of forewing and the whole hindwing rufous-testaceous, covered with minute, transverse, brown speckles; a discal line, parallel to outer margin, curving costad in front, vestigial on forewing, in one individual altogether absent.

Vaginal cavity partly filled up by a carinate tubercle.

Early stages not known.

Hab. Sumba.

Three ♀♀ in the Tring Museum.

This and *indistincta* may be forms of the same species. Considering, however, that *inornata* and *indistincta* are doubtless distinct in spite of the great similarity, we think it safer to treat *incarnata* also as distinct.

724. Theretra indistincta (Pl. XIV. f. 11, ♂).

**Chaerocampa indistincta* Butler, *Ann. Mag. N. H.* (4). xix. p. 460 (1877) (Rockhampton ;—Mus Brit., ♀).

Chaerocampa cleopatra Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 15. n. 25 (1891) (Brisbane).

Chaerocampa curvilinea Lucas, *Queenslander* xxxix. p. 834 (May, 1891) (Brisbane) ; Misk., *l.c.* p. 64 (1891).

Theretra cleopatra, Kirby, *Cat. Lep. Het.* i. p. 656. n. 64 (1892).

Theretra indistincta, id., *l.c.* n. 72 (1892).

Theretra curvilinea, id., Nov. Zool. i. 101 (1894).

♂♀. Palpus and foretarsus as in the preceding species. A grey-olive insect, somewhat silvery grey. Scaling of antenna, costal edge of forewing and abdomen (especially below) more or less pinkish, foretibia and -tarsus almost white. Forewing with a single, not very prominent line as in *inornata*, separated at SC^5 from the short, indistinct, apical line ; there are proximally traces of one or two more discal lines, one of which stands close to the main line ; in the ♀ the wing is speckled with brown scales.

♂. Tenth segment as in *inornata* and *butus*. Harpe as in *butus*, but more obviously dentate ; friction-scales of clasper narrow, as numerous as in *inornata*. Patch of teeth of penis-sheath prolonged proximad, the teeth pointing proximad as in *butus*.

Early stages not known.

Hab. Queensland.

In the Tring Museum 5 ♂♂, 3 ♀♀ from : Mackay ; Bongu, Huon Golfe.

725. Theretra inornata (Pl. XIV. f. 10, ♂).

**Chaerocampa inornata* Walker, *List Lep. Ins. B. M.* xxxi. p. 31 (1864) (N. Austr. ;—Mus. Brit.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 561. n. 38 (1877) ; Misk., *Proc. Roy. Soc. Queensld.* viii p. 18. n. 31 (1891).

Chaerocampa pallida Miskin, *l.c.* n. 29 (1891) (Brisbane).

Theretra pallida, Kirby, *Cat. Lep. Het.* i. p. 655. n. 54 (1892).

Theretra inornata, id., *l.c.* n. 56 (1892).

♂♀. Cavity of palpus as sharply defined as in *tryoni*, the scaling regular. First protarsal segment with a single external row of spines. Scaling of antenna pinkish white ; a black apical patch. The pale lateral band of thorax vestigial on pronotum, indicated by a fine line (often abbreviated) on head. Forewing, *above*, with a single, straight, line, which is 5 mm. distant from outer margin at SC^5 and then

curves towards tip of wing, the upper end mostly vestigial. Wings neither with lines or dots on the *underside*, nor with a brown border : hindwing and costal edge of forewing somewhat pinkish.

♂. Sexual armature nearly as in *tryoni*, but the modified scales on the outer side of the clasper narrower and much more numerous, the hairs on the harpe longer, and the patch of teeth on the penis-sheath narrower.

Early stages not known.

Hab. Queensland.

In the Tring Museum 6 ♂♂, 6 ♀♀ from : Mackay (Turner) ; Duaringa, Dawson R. (Barnard, Meek).

726. Theretra latreillei.

Sphinx latreillei MacLeay, in King, *Surv. Austr.* ii. p. 464. n. 165 (1827).

Chaerocampa latreillei, Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 17. n. 27 (1891) (= *lucasi* = *communens* = *deserta* = *tenebrosa* = *spilota*).

♂ ♀. Cavity at end of first segment of palpus partly concealed by the irregular scaling (Pl. LIX. f. 13), the palpus differing in this respect remarkably from that of *tryoni* : scaling at end of first segment on innerside less regular (Pl. LIX. f. 14) than in *tryoni* (Pl. LIX. f. 15). External row of spines of first protarsal segment double, at least at the base. Head and thorax with a pale lateral band. Discal row of vein-dots of forewing less heavy than in *tryoni* ; fringe not distinctly spotted.

♂. Tenth abdominal tergite much longer and slenderer than in *tryoni* ; apex of sternite rounded-truncate. Clasper as in *tryoni* ; harpe prolonged into a free, straight, obtuse, somewhat tapering process (Pl. LII. f. 19). Tip of penis-sheath (Pl. LVIII. f. 6) acute ; patch of teeth broader and shorter than in *tryoni*, the teeth mostly three-pointed, few four-pointed.

Larva with one large ocellus on fourth segment.—Food-plant : *Cissus* ; *Leea* ; etc.

Hab. Oriental Region.

Two subspecies, which intergrade completely.

a. Th. latreillei latreillei.

Sphinx latreillei MacLeay, *l.c.*

**Chaerocampa communens* Walker, *l.c.* xxxi. p. 31 (1864) (Moreton Bay ;—Mus. Brit.) ; Butl., *l.c.* ix. p. 561. n. 37 (1877) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 21. n. 80 (1892) (Queensland ; Aru ; Burn).

Diludia ? latreillei, Butler, *Trans. Zool. Soc. Lond.* ix. p. 614. n. 12 (1877).

**Chaerocampa deserta* id., *l.c.* ix. p. 638 (1877) (Hunter R., Austr. ;—Mus. Brit.).

**Chaerocampa waldhecki* id., *Trans. Ent. Soc. Lond.* p. 398. t. 9. f. 2 (1877) (Austral. ;—Mus. Brit.) ; Misk., *l.c.* p. 18. n. 30 (1891) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 21. n. 81 (1892) (Batchian ; Ternate).

Chaerocampa latreillei, Kirby, *Trans. Ent. Soc. Lond.* p. 235 (1877) (= *communens*) ; Misk., *l.c.* p. 17. n. 27 (1891) (Queensland ; larva on *Fuchsia* and *Vitis*).

Chaerocampa lucasi, Pagenstecher, *Jahrb. Nass. Ver. Nat.* xxxvii. p. 209 (1884) (Amboina) ; id., *l.c.* xxxix. p. 112. n. 6 (1886) (Aru) ; id., *Iris* i. p. 86. n. 6 (1886) (Aru) ; id., *Jahrb. Nass. Ver. Nat.* xli. p. 108. n. 209 (1888) (Amboina) ; id., *Abh. Senk. Nat. Ges.* xxiii. p. 444. n. 424 (1897) (Ternate ; Halmahera) ; id., in Chun, *Zoologica* xii. 19. p. 14. n. 11 (1900) (Ralum, vii. xii. ; N. Lauenburg).

Chaerocampa latreilii (!), Miskin, *l.c.* p. 18. sub n. 28 (1891).

Chaerocampa luteotincta Lucas, *Queenslander*, xxxix. p. 894 (May 1891) ; Misk., *l.c.* p. 64 (1891).

**Chaerocampa amara* Swinhoe, *l.c.* p. 17. n. 82. t. 1. f. 9 (♂) (1892) (Mysol ; Amboina ;—Mus Oxford).

Theretra latreillei, Kirby, *l.c.* n. 52 (1892).
Theretra waldlucki, id., *l.c.* n. 55 (1892).
Theretra deserta, id., *l.c.* n. 57 (1892).
Theretra amara, id., Nov. Zool.. i. p. 101. n. 52. a (1894).
Theretra luteotincta, id., *l.c.* n. 118 (1894).

♂♀. Abdomen without vestiges of dorsal lines. Wings and body a little paler than in the following form, the lines of the forewing less prominent, mostly only lines 1 and 4 distinct, therefore the wings more uniform in colour ; ground-colour sometimes slightly vinaceous. Penis-sheath see Pl. LVIII. f. 6.

Hab. Papuan Subregion : Moluccas eastward.

In the Tring Museum 50-odd specimens from : Amboina ; Ceram ; Buru : Obi ; Key ; Aru ; N. Guinea ; W. Australia ; Queensland ; Bismarck Archipelago : Solomon Is.

b. Th. latreillei lucasi.

**Chaerocampa lucasi* Walker, *List Lep. Ins. B. M.* viii. p. 141. n. 24 (1856) (N. India ; Silhet ;—Mus. Brit.) ; Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 277. n. 642. t. 11. f. 3. 3. a (*l.*, *p.*) (1857) (Java ; Canara) ; id., *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 560. n. 36 (1877) ; Snell., *Tijdschr. Ent.* xxii. p. 66. n. 16 (1877) (S. Celebes ; partim) ; Swinh., *Proc. Zool. Soc. Lond.* p. 288. n. 19 (1885) (Bombay, ix.—xi.) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 17. n. 95 (1887) ; Swinh., *Trans. Ent. Soc. Lond.* p. 164. n. 15 (1890) (Rangoon, xii.) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xliii. p. 101. n. 178 (1890) (E. Java) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 18. n. 83 (1892) (Java ; Sarawak ; Silhet) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 92. n. 140 (1892) (syn. partim) ; Semp., *Schm. Philipp.* ii. p. 398. n. 37. t. r. f. 6. 7 (*l.*, *p.*) (1896) (Luzon ; Bohol : Cebu ; Mindanao) ; Piep., *Tijdschr. Ent.* xl. p. 99. t. 2. f. 1. 2. 3 (*l.*) (1897) (Java).
Chaerocampa lucasi (!), Moore, in Horsf. & Moore, *l.c.* (1857).
Deilephila spilota id., *l.c.* (1857).
Chaerocampa procne Clemens, *Journ. Ac. Nat. Sc. Philad.* iv. p. 151. n. 35 (1859) ("California" *lucasi error*) ; Morris, *Cat. Lep. N. Am.* p. 20 (1860) ; Clem., in Morris, *Syn. Lep. N. Am.* p. 173. n. 4 (1862) ; Walk., *List Lep. Ins. B. M.* xxxi. p. 30 (1864) ; Grote & Rob., *Proc. Ent. Soc. Philad.* v. p. 155. n. 42 (1865) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 564. n. 60 (1877) ; id., *l.c.* p. 638 (1877) (probably Asiatic) ; Maass., *Stett. Ent. Zeit.* xli. p. 56 (1880) (= *lucasi*) ; Smith, *Trans. Amer. Ent. Soc.* xv. p. 137 (1888).
Choerocampa lucasi, Walker, *Journ. Linn. Soc. Lond.* vi. p. 84. n. 8 (1862) (Sarawak) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 254. n. 37 (1875) (Luzon ; Java : N. India).
Metopsilus (?) *procne*, Grote, *Bull. Buffalo S. N. Sc.* i. p. 22 (1874).
Metopsilus procne, id., *l.c.* ii. p. 226. n. 34 (1875).
Choerocampa procne, Strecker, *Lep. Rhop. Het.* p. 114. t. 13. f. 10 (1876) ("California").
Chaerocampa relox, Snellen (*non* Fabricius, 1775), *Tijdschr. Ent.* xx. p. 2. n. 7 (1877) (Java ; = *lucasi*) ; id., *l.c.* p. 67 (1877) (Sumatra).
**Chaerocampa tenebrosa* Moore, *Proc. Zool. Soc. Lond.* p. 595 (1877) (St. Blair ;—Mus. Brit.) ; Cot. & Swinh., *l.c.* p. 18. n. 96 (1887).
Hathia lucasi, Moore, *Lep. Ceylon* ii. p. 20. t. 86. f. 3 (1882).
Hathia tenebrosa id., *l.c.* 2. 2a (*l.*, *p.*, *i.*) (1882).
Theretra tenebrosa, Kirby, *Cat. Lep. Het.* i. p. 655. n. 50 (1892).
Theretra lucasi, Kirby, *l.c.* n. 51 (1892) ; Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 24 (1895) (Java) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 112. n. 140 (1898) ("not seen").
Theretra procne, Kirby, *l.c.* p. 657. n. 88 (1892) ("California").

♂♀. Dorsal lines of abdomen more or less plainly marked. ——Forewing : a black basal patch at internal margin, more or less vestigial ; six discal lines, the first nearly always dilated near apex of cell.——First segment of protarsus with a single external row of spines in most individuals.

Hab. Indo-Malayan Subregion : Ceylon to North India, eastwards to the Philippines, Celebes, Java.

In the Tring Museum 60-odd specimens from : Celebes ; Dammer ; Sumba ;

Lombok ; Java ; Borneo ; Sumatra; Nias ; Andamans ; Malay Pen. ; North and South India ; Ceylon.

A sketch of the palpus of Strecker's specimens sent to us by Mr. Franck proves *procne* as figured by Strecker to be *latreillei lucasi*, as suggested by Maassen, *l.c.*

727. Theretra tryoni.

Chaerocampa butus, Herrich-Schäffer (*non* Cramer, 1777), *Aussereur Schm.* f. 559 (1869).
Chaerocampa tryoni Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 17. n. 28 (1891) (Brisbane).
Theretra tryoni, Kirby, *Cat. Lep. Het.* i. p. 655. n. 53 (1892).
Theretra herrichi id., *l.c.* n. 62 (1892) (nom. nov. loco "butus Herr.-Sch.").

♂ ♀. Mesothorax without a pale lateral stripe ; second abdominal tergite distinctly black at the sides, this colour extending backwards in some individuals to the third or fourth segment. Line 4 of forewing strongly accentuated by nerve-dots, and fringe also with black nerve-dots. External row of spines of first protarsal segment single. Cavity of palpus sharply defined, the scaling round it regular (Pl. LIX. f. 16) ; Pl. LIX. f. 15 represents the end of the first segment as seen from the inner side, the second segment broken off ; Pl. LIX. f. 27 gives a view of the inner surface of the entire palpus. Scaling of antenna olive towards base.

♂. Tenth abdominal tergite gradually narrowed, convex above, apex sinuate, the angles rounded ; sternite obtusely pointed. Clasper with a patch of about ten enlarged scales, arranged in two or three oblique rows, nearer apex than base of clasper ; harpe short (Pl. LII. f. 20), obtuse, without free process, no teeth. Penis-sheath (Pl. LVIII. f. 4. 5) : the teeth mostly four-pointed, few of them three-pointed.

Early stages not known.

Hab. Papuan Subregion : Queensland ; N. Guinea ; Moluccas ; Solomon Is.

In the Tring Museum 10 ♂♂, 14 ♀♀ from ; Brisbane, Rockhampton, Cooktown, Mackay ; Milne Bay, Brit. N. Guinea (Meek) ; Fergusson I. and Trobriand Is. (Meek); Rossel I. (Meek); Little Key (Kühn) ; Amboina ; Buru (Doherty) ; Isabel I., Solomon Is. (Meek & Eichhorn).

728. Theretra jugurtha.

**Chaerocampa jugurtha* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 256. n. 39 (1875) (Senegal ;—coll. Charles Oberthür).
Theretra jugurtha, Kirby, *Cat. Lep. Het.* i. p. 656. n. 67 (1892).
Choerocampa clotho, Schaus & Clemens, *Sierra Leone Lepid.* p. 18 (1893).
**Theretra obliterata* Rothschild, Nov. Zool. i. p. 75 (1894) (Sierra Leone ;—Mus. Tring) ; id., *l.c.* iii. t. 14. f. 11 (1896).

♂ ♀. Cavity at end of first segment of palpus sharply defined, the scaling regular. External row of spines of the first protarsal segment single, or doubled at base. Of the lines on the forewing only lines 1 and 5 are marked, seldom also line 2, besides the oblique apical line, which joins line 5. The pale lateral band of head and thorax is obliterated, being vestigial before the antenna ; no lines on the abdomen, but a black basal lateral patch sometimes indicated.

♂. Tenth abdominal segment as in *capensis*, but the sternite rather more triangular. Friction-scales of clasper not numerous, large; process of harpe (Pl. LII. f. 24) very long, slender. Armature of penis-sheath similar to that of the following species, but the left row of teeth less extended (Pl. LVIII. f. 12), not beginning apically, but laterally.

♀. Apical and lateral edges of the vaginal plate raised a little, as in the allied species ; edge of mouth of vagina rather feebly chitinised.

Early stages not known.

Hab. West Africa : Senegal to the Congo.

In the Tring Museum 22 ♂♂, 15 ♀♀ from : Sierra Leone : Ogrugu, Niger ; Congo.

729. Theretra capensis.

Zschach, *Mus. Lesk.* p. 95. n. 183. t. 31 (1788).

Sphinx capensis Linné, *Mus. Lud. Ulr.* p. 349. n. 9 (1764) ; Houtt., *Naturl. Hist.* i. 11. p. 451. t. 90. f. 5 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 800. n. 10 (1767) ; Mart., *Allg. Gesch. Nat.* i. p. 84 (1774) ; Goeze, *Ent. Beytr.* iii. 2. p. 160. n. 10 (1780) ; Gmel., *Syst. Nat.* i. 5. p. 2379. n. 10 (1790) ; Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 132. n. 167 (1882) (recens. crit. : = *aeas* = *immaculata* = *ostracina*) ; id., *Ent. Tidskr.* xviii. p. 153. sub n. 84 (1897) (= *clotho* Fabr.).

Sphinx megara Müller, *Naturs.* v. 1. p. 642. n. 21. t. 20. f. 5 (1774 (India !).

Sphinx aeas Cramer, *Pap. Exot.* iii. p. 57. t. 226. f. A (1779).

Sphinx cecrops id., *l.c.* p. 57. t. 226. f. B (1779).

Sphinx clotho, Fabricius (*non* Drury, 1773), *Mant. Ins.* ii. p. 97. n. 57 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2384. n. 85 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 376. n. 60 (1793).

Sphinx immaculata Gmelin, *Syst. Nat.* i. 5. p. 2386. n. 160 (1790).

Enmorpha elegans capensis, Hübner, *Samml. Ex. Schm.* i. t. 168 (1806–?).

Thaumas capensis, id., *Verz. bek. Schm.* p. 138. n. 1477 (1822).

Thaumas cecrops, id., *l.c.* p. 138. n. 1478 (1822).

Choerocampa capensis, Boisduval, in Deleg., *Voy. Afr. Austr.* p. 595. n. 104 (1847) (Natal) ; id., *Spec. Gén. Lép. Hét.* i. p. 234. n. 12 (1875) ; Westw., in Oates, *Matabeleld.* p. 355 (1881).

Chaerocampa capensis, Walker, *List Lep. Ins. B. M.* viii. p. 139. n. 21 (1856) (Cape ; Natal ; Zululd.) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 555. n. 9 (1877) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxxiii. p. 287. n. 82 (1884) (Caffraria) ; Fawc., *Trans. Zool. Soc. Lond.* xv. p. 308. n. 10. t. 47. f. 17. 18. 19 (*l., p.*) (1900).

Chaerocampa cecrops, Walker, *l.c.* p. 145. n. 30 (1856) (var. of *capensis* ?) ; Butl., *l.c.* p. 555. n. 8 (1877).

Gnathostypsis ostracina Wallengren, *Wien. Ent. Mon.* iv. p. 42. n. 43 (1860) (Caffraria) : id., *Kongl. Sv. Vet. Ak. Handl.* v. 4. p. 18 (Separ.) (1865) (Caffraria).

Choerocampa cecrops, Boisduval, *l.c.* p. 235. n. 13 (1875).

Theretra capensis, Kirby, *Cat. Lep. Het.* i. p. 651. n. 9 (1892).

Sphinx 8-maculata (!), id., *l.c.* p. 651. sub n. 9 (1892) (laps. cal.).

Theretra ostracina, id., *l.c.* n. 10 (1892).

Theretra cecrops, id., *l.c.* n. 12 (1892).

♂♀. Rather variable. Body and wings sometimes all red. No dorsal lines on abdomen, basi-lateral patch red. Forewing with a dark subcostal cloud at apex of cell ; just beyond there is occasionally a line curving costad, abbreviated behind, another discal line further distal, about parallel to margin, also curving costad, to which is joined an oblique apical line ; if the costal, curved part of this discal line is absent, the apical and second discal lines form one single straight line ; the area outside the discal line is often brown. The buff border of the hindwing is sometimes replaced by a brown border, or becomes reddish. Cavity of palpus sharply defined, there being no single long scales projecting into or over the opening.

♂. Tenth tergite narrower than in *alecto*, not sinuate ; sternite broad, sides parallel, apex rounded-truncate, with the sides somewhat bent upwards, so that the apex appears sinuate in a distal view. Friction-scales of clasper numerous, but rather large : process of harpe horizontal, curving upwards distally, apex spoon-shaped, being concave above. Penis-sheath essentially as in the preceding species, the right-side process rather slenderer.

♀. The edge of the mouth of the vagina rather high, elevated to a thin smooth ridge, which gradually fades away distally.

Larva with one large eye-spot on fourth segment; a pale stripe from fifth segment to horn, vestigial or absent from thorax; horn short and stout in adult larva, long and ∽-shaped in younger stages; ground-colour green or tawny.— Food-plants: *Vitis*; *Cissus*.

Hab. South and South-East Africa.

In the Tring Museum several larvae, 80-odd specimens from: Cape Colony; Natal; Transvaal.

730. Theretra alecto.

Sphinx alecto Linné, *Syst. Nat.* ed. x. p 492. n. 18 (1758): Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 138. n. 175 (1882) (rec. crit.).
Isoples alecto, Hübner, *Verz. bek. Schm.* p. 135. n. 1453 (1822).
Chaerocampa alecto, Walker, *List Lep. Ins. B. M.* viii. p. 130. n. 3 (1856); Staud. & Reb., *Cat. Lep.* ed. iii. p. 103. n. 757 (1901).
Choerocampa alecto, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 229. n. 6 (1875).
Theretra alecto, Kirby, *Cat. Lep. Het.* i. p. 650. n. 6 (1892).
Deilephila alecto, Bartel, in Rühl, *Grossschm.* ii. p. 113 (1900).

♂♀. Cavity of palpus not well defined proximally, owing to some long scales projecting over it. External row of spines of first protarsal segment single, or partially doubled. Line 5 of forewing heavy, sometimes also 1, lines 2 and 4 weak, 6 and 7 vestigial or absent. Dorsal lines of the abdomen often absent, sometimes rather plainly marked.

♂. Tenth abdominal tergite rather narrow, underside feebly concave apically, clothed with erect hairs, apex rounded, feebly sinuate; sternite obtusely pointed, apex curved upwards, strongly convex beneath. Clasper with numerous friction-scales; harpe slender, feebly ∽-shaped, pointed. Penis-sheath (Pl. LVIII. f. 11) at the right side with a short multidentate process, and at the left with a long oblique row of teeth situated upon a slightly elevated ridge, which ends in a slender process that lies closely upon the sheath.

♀. Vaginal armature of the same type as in *eson* (Pl. XLI. f. 15); the ridge before the mouth of the vagina rather thin, but well chitinised and smooth, becoming gradually lower postically, forming a kind of halfmoon.

Larva: seven eye-spots, the five posterior ones often reduced and incomplete; pale dorso-lateral stripe of thorax not so prominent as in *H. celerio*; horn rather short and stout in last stage.— Food-plants: *Vitis*; *Psychotria*; *Paederia*; etc.

Chrysalis: tongue-case strongly compressed, prominent; cremaster conical, somewhat depressed.

Hab. Oriental Region, extending into the Palaearctic Region: from the Caspian Sea and Asia Minor to the Key Islands; not in China, Japan, and Ceylon.

Two subspecies:

a. Th. alecto alecto.

Sphinx alecto Linné, *l.c.* (1758) (India); id., *Mus. Lud. Ulr.* p. 357 (1764); Houtt., *Naturl. Hist.* i. 11. p. 450. n. 18 (1767); Linné, *Syst. Nat.* ed. xii. p. 802. n. 20 (1767); Drury, *Illustr. Ex. Ins.* ii. p. 48. & *Index* t. 27. f. 4 (1771–73) (Madras); Fabr., *Syst. Ent.* p. 546. n. 31 (1775); Cram., *Pap. Exot.* ii. p. 62. t. 137. f. D (1777); Goeze, *Ent. Beytr.* iii. 2. p. 173. n. 20 (1780); Fabr., *Spec. Ins.* ii. p. 152. n. 52 (1781); id., *Mant. Ins.* ii. p. 97. n. 56 (1787); Gmel., *Syst. Nat.* i. 5. p. 2381. n. 20 (1790); Fabr., *Ent. Syst.* iii. 1. p. 376. n. 59 (1793); Herr.-Sch., *Ear Schm.* ii. p. 85. n. 10. *Sphing.* t. 2. f. 4. 5 (1847).

Sphinx alecto (!), Müller, *Naturs.* v. 1. p. 641. n. 20 (1774).
Isoples alecto, Hübner, *l.c.* (1822).
Chaerocampa alecto, Walker, *l.c.* (1856) (partim) ; Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 275. n. 635. t. 10. f. 4. 4a. (*l., p.*) (1857) (Java ; Darjiling) ; Moore, *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal) ; Semp., *Verh. Zool. Bot. Ges. Wien* xvii. p. 700. n. 13 (1867) (larva) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 555. n. 6 (1877) ; Snell., *Tijdschr. Ent.* xx. p. 1. n. 3 (1877) ; id., *l.c.* p. 67 (1877) (Sumatra) ; Butl., *Proc. Zool. Soc. Lond.* p. 670. n. 32 (1880) (Formosa) ; Swinh., *ibid.* p. 288. n. 11 (1885) (Poona, ii. xi. ; Bombay, viii.—x.) ; Butl., *l.c.* p. 379. n. 93 (1886) (Murree, viii.) ; Swinh., *l.c.* p. 434. n. 5 (1886) (Mhow, iii. ix.) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 15. n. 83 (1887) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 106. n. 202 (1888) (Amboina) ; Swinh., *Journ. Bombay N. H. Soc.* iii. p. 118. n. 8 (1888) (Karachi, vii. ix.) ; Pagenst., *l.c.* xliii. p. 101. n. 176 (1890) (E. Java) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 15. n. 59 (1892) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 85. n. 120 (1892) ; Semp., *Schm. Philipp.* ii. p. 394. n. 28. t. E. f. 1—4 (*l., p.*) (1896) (Luzon ; Bohol ; Cebu : Mindanao ; vi. viii.—iii.) ; Staud. & Reb., *l.c.* (1901) (partim).
Chaerocampa cretica, Butler, *Proc. Zool. Soc. Lond.* p. 411. n. 24. t. 39. f. 8 (1880) (Kandahar : deser. of larva) : Swinh., *Trans. Ent. Soc. Lond.* p. 346. n. 4 (1885) (Kandahar, vi., common).
Theretra alecto, Kirby, *l.c.* (1892) (partim) ; Huwe, *Berl. Ent. Zeit.* xl. p. 364. n. 16 (1895) (Java) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 412. n. 120 (1898) (Sikhim, Bhutan, v.—x., up to 8000 ft.).
Deilephila alecto, Bartel, *l.c.* (1900) (partim).

♂ ♀. The tropical subspecies is deep in tint ; the difference between it and the following form is very obvious if a series of both subspecies are viewed side by side.

Hab. N.W. India, South India, Formosa, eastward to the Key Islands, northward to Formosa.

In the Tring Museum 120-odd specimens from : Sikhim ; Bhutan ; Khasia Hills ; Borneo ; Nias ; Java ; Sambawa ; Sumba ; Celebes ; Larat, Teuimber ; Key.

b. Th. alecto cretica.

**Sphinx cretica* Boisduval, *Ann. Soc. Linn. Paris* p. 118. t. 6. f. 5 (♀) (1827) (♀ ; ♂ *alia spec.* ;—coll. Charles Oberthür) ; Bugn., *Ann. Soc. Ent. France* p. 113 (1839).
Deilephila cretica Boisduval. *Icon. Hist. Lép.* ii. p. 20 (1834) (♀, nec ♂) ; Dup., in God., *Pap. France, Suppl.* ii. p. 15. t. 1. f. 3 (1835) ; Treit., in Ochs., *Schm. Eur.* x. p. 138 (1834) ; Frey., *N. Beytr.* v. p. 34. t. 404. f. 1 (1843).
Sphinx alecto, Ménétriés, *Cat. Obj. Zool. Caucase* p. 258. n. 1237 (1832) ; Hiss, in Silberm., *Rev. Ent.* ii. p. 169 (1834) (Gsteig, Senaar, Alps).
Deilephila (!) *alecto*, Rousin, *Bull. Soc. Ent. France* p. 27 (1846) (Constantinople).
Chaerocampa alecto, Walker, *l.c.* (1856) (partim) ; Mén., *Enum. Corp. Anim. Mus. Petr., Lep.* ii. *Suppl.* p. 91. n. 1517 (1857) (Graecia ; Daghestan) : Staud. & Reb., *l.c.* (1901) (partim).
Deilephila alecto, Bienert, *Lep. Erg. Reise Pers.* p. 32 (1869) (vii. viii.) ; Led., *Ann. Soc. Ent. Belg.* p. 28 (1872) (Casp. Sea) ; Christ., *Stett. Ent. Zeit.* xxxiii. p. 206 (1872) (Baku) ; id., *Hor. Soc. Ent. Ross.* x. p. 31 (1873) (Shahrud ; Baku) ; Staud., *ibid.* xiv. p. 298 (1878) (Rhodus, v. ; Brussa ; Anatolia) ; Rom., *Mém. Lép.* i. p. 71 (1884) (iv.—vii. ; west coast of Casp. S. ; Helenendorf, Lagodekhi) ; Led., *Verh. Zool. Bot. Ges. Wien* p. 197 (1885) ; Christ., *l.c.* iii. p. 54 (1887) (Askhabad) ; Mina-Pal. & Failla-Ted., *Nat. Sicil.* vii. p. 42 (1889) (Sicily ?) ; Grum-Grsch., in Rom., *Mém. Lép.* iv. p. 511. n. 206 (1890) (Ferghana, common, viii.) ; Hofm., *Raup. Grossschm.* p. 29. t. 48. f. 10 (1893) ; id., *Grossschm.* p. 30. n. 10. t. 17. f. 10 (1894) ; Holtz, *Illustr. Zeitschr. Ent.* ii. p. 63 (1897) (Cilicia, ix.) ; Bartel, *l.c.* (1900) (partim).
Chaerocampa alecto var.?, Butler, *Trans. Zool. Soc. Lond.* ix. p. 555. sub n. 6 (1877) (Turkey).
Theretra alecto, Kirby, *l.c.* (1892) (partim).
Theretra fregeri id., *l.c.* n. 7 (1892).

♂ ♀. Paler than the tropical form ; body above and forewing less deep brown and the hindwing less bright red.

Hab. Ferghana ; Transcaucasia ; Asia Minor ; Syria ; North Persia.

In the Tring Museum 1 larva, 1 pupa, 8 ♂♂, 18 ♀♀ from : Beirut ; Haifa ; Taschkent ; Merw ; Kacadian, Oxus.

Boisduval described and figured a Palaearctic ♀ of *alecto* as *cretica* ; at the end of the description he referred to another insect as being perhaps the ♂ : this latter he figured later on as the ♂ of *cretica*. The name *cretica* must of course stand for what it was originally intended, namely the Palaearctic form of *alecto*.

731. Theretra suffusa.

**Chaerocampa suffusa* Walker, *List Lep. Ins. B. M.* viii. p. 146. n. 32 (1856) (Hongkong ;—Mus. Brit.) ; Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 275. n. 636 (1857) (China ; Borneo) : Butl., *Trans. Zool. Soc. Lond.* ix. p. 555. n. 7 (1877) (Hongkong ; Borneo) ; Salv., *Proc. Zool. Soc. Lond.* p. 642 (1878) (Billiton I.) ; Butl., *Illustr. Typ. Specim. Lep. Het.* iii. p. 1. t. 41. f. 1 (1879) ; Snell., *Tijdschr. Ent.* xxviii. p. 254. t. 9. f. 2 (1885) (Java) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 15. n. 58 (1892) (Sarawak ; Penang ; Singapore : Silhet ; Assam).

Choerocampa suffusa Walker, *Journ. Linn. Soc. Lond.* vi. p. 84. n. 11 (1862) (Sarawak) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 230. n. 7 (1875) (Assam).

Choerocampa hector id., *l.c.*

Theretra suffusa, Kirby, *Cat. Lep. Het.* i. p. 650. n. 8 (1892) (China ; Borneo).

♂ ♀. Closely allied to the preceding species. A greyish mesial band from mesonotum to end of abdomen ; the latter brown above, without black basal patch, an obscurely marked greyish dorso-lateral stripe from segment 3 backwards. Lines 1 and 5 of forewing heavy, 2 fused with 1, lines 6 and 7 also rather heavy, interspaces between 1 and 5 pale, between 5 and 6 dark. The black basal area of the hindwing much more restricted than in *alecto*, not dilated distad before abdominal margin.

Genital armature as in *alecto*, but the tenth sternite rather broader, more obtuse, less curved ; process of harpe less slender, somewhat spoon-shaped, twisted.

Early stages not known.

Hab. Indo-Malayan Subregion : China, North India to Borneo and Java.

In the Tring Museum 19 ♂♂, 9 ♀♀ from : China ; Penang and Perak, ii. (Curtis) ; Singapore, v. ; Loeboe Rajah, W. Sumatra (Ericsson) ; Sarawak.

732. Theretra japonica.

**Choerocampa japonica* Orza, *Lèp. Japon* p. 36. n. 79 (1869) ; Boisd., *Spec. Gén. Lép. Hét.* i. p. 241. n. 20 (1875) (coll. Charles Oberthür).

Chaerocampa japonica, Butler, *Trans. Zool. Soc. Lond.* ix. p. 560. n. 34. t. 91. f. 7. 8. 9 (*l., p.*) (1877) (Hakodate ; Japan ; Shanghai) ; id., *Proc. Zool. Soc. Lond.* p. 815. n. 44 (1877) (Formosa) ; Staud., in Rom., *Mém. Lép.* iii. p. 159 (1887) ; Leech, *Proc. Zool. Soc. Lond.* p. 584. n. 14 (1888) (Satsuma, v. ; Nagasaki, vi. ; Hakodate, viii. ; Yokohama) ; id., *Trans. Ent. Soc. Lond.* p. 120. n. 99 (1889) (Kiukiang) ; id., *l.c.* p. 283. n. 52 (1898) (Yokohama ; Satsuma ; Hakodate : Kiukiang ; Chang-Yang ; Corea) ; Staud. & Reb., *Cat. Lep.* ed. iii. p. 103. n. 756 (1901).

Deilephila japonica, Fixsen, in Rom., *Mém. Lép.* iii. p. 320. n. 95 (1887) (Corea, vii. ; = *gortys* err.) ; Bartel, in Rühl, *Grossschm.* ii. p. 110 (1900).

Theretra japonica, Kirby, *Cat. Lep. Het.* i. p. 654. n. 43 (1892).

♂ ♀. Dorsal lines of abdomen obscure. Discal band of forewing formed by two separate lines, lines 1 and 2 being merged together, interspaces between lines 1 + 2 and 5 of nearly the same breadth.

According to the dated material from Japan there is some seasonal variation, the spring specimens being on the whole paler than the summer specimens. The Amur individuals which we have seen in collections are unfortunately not dated,* but both forms occur in Amurland as well as in China.

* Collectors of Palaearctic Lepidoptera generally do not care to have the specimens exactly labelled. The bad influence in this respect of certain dealers is everywhere felt. Our American brethren in Entomologicis are mostly more advanced, even some of the dealers. One of the latter was quite astonished that we, being Europeans, wanted the date of capture of the specimens ; such a request had never been made of him by a European Continental Lepidopterist.

♂. Tenth tergite very slender, rounded at end, upperside convex, but not subcarinate; sternite broad, sides parallel, apex truncate with the angles rounded. Process of harpe short, broad, hollowed out distally, the ridges bordering the cavity notched (Pl. LII. f. 18). Penis-sheath (Pl. LVII. f. 41): the band-like armature narrow, the proximal edge of the left-side lobe dentate; the right-side process short, dentate.

Larva green or brown; a white dot on third thoracic segment; a white ocellus with brown centre and black edge on fourth segment, a similar but smaller ocellus on the fifth and a small blind white ocellus on the sixth; a pale stripe from the fifth or sixth segment to horn, gradually fading away below, the pale sides with darker oblique shades.—Food-plant: *Cissus*.

a'. Th. japonica f. vern. *suifuna*.

**Deilephila japonica* var. *? suifuna* Staudinger, in Rom., *Mém. Lép.* vi. p. 228. n. 214. t. 4. f. 2 (♂) (1892) (Amur;—coll. Staudinger).

Deilephila japonica var. *suifuna*, Bartel, *l.c.* ii. p. 110 (1900); Kirby, Nov. Zool. i. p. 101 (1894).

Chaerocampa japonica var. *suifuna*, Staudinger & Rebel, *l.c.* n. 756a (1901).

♂♀. A pale form; sides of thorax, base and discal interstices of forewing more whitish than in the summer specimens, external area of hindwing also paler.

b'. Th. japonica f. aest. *japonica*.

**Chaerocampa japonica* Orza, *l.c.*

♂♀. A darker form. The differences are *very* slight and the two forms intergrade completely.

Hab. Japan; Corea; Amurland; China; Formosa.

In the Tring Museum 8 larvae and 80-odd specimens from: Hakodate; Yokohama; Amurland; Wei-hai-wei; Ta-tsien-lu, W. China; Taipeh, Formosa.

733. Theretra lycetus.

Sphinx lycetus Cramer, *Pap. Exot.* i. p. 96. t. 61. f. D (1775) (Bengal; Coromandel; Ceylon); Goeze, *Ent. Beytr.* iii. 2. p. 220. n. 57 (1780); Fabr., *Spec. Ins.* ii. p. 148. n. 38 (1781); id., *Mant. Ins.* ii. p. 96. n. 42 (1787); Gmel., *Syst. Nat.* i. 5. p. 2381. n. 76 (1790); Fabr., *Ent. Syst.* iii. 1. p. 371. n. 45 (1793); Lep. & Serv., *Enc. Méth.* x. p. 466. t. 66. f. 6 (1825).

Xylophanes lycetus, Hübner, *Verz. bek. Schm.* p. 136. n. 1457 (1822).

Chaerocampa lycetus, Walker, *List Lep. Ins. B. M.* viii. p. 143. n. 26 (1856); Horsf. and Moore, *Cat. Lep Ins. Mus. E. I. C.* i. p. 277. n. 643 (1857) (N. India); Cot. & Swinh., *Cat. Moths Ind.* i. p. 17. n. 94 (1887); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 87. n. 124 (1892) (= *rosina* = *prunosa*; "*draucus*" alia spec.; Mussorie; Sikhim; Ceylon).

Chaerocampa lycetus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 262. n. 48 (1875).

**Chaerocampa rosina* Butler, *Proc. Zool. Soc. Lond.* p. 248. n. 26. t. 37. f. 6 (1875) (Masuri;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 559 n. 31 (1877); Cot. & Swinh., *l.c.* i. p. 17. n. 91 (1887) (Sikhim).

**Chaerocampa prunosa* Butler, *Proc. Zool. Soc. Lond.* p. 622 (1875) (Ceylon;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 637 (1877); Cot. & Swinh., *l.c.* p. 20. n. 108 (1887).

Xylophanes prunosa, Moore, *Lep. Ceylon* ii. p. 19. t. 84. f. 2 (1882).

Theretra lycetus, Kirby, *Cat. Lep. Het.* i. p. 653. n. 32 (1892); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 412. n. 124 (1898) (Sikhim, 1800 ft., iv. vi. viii. x.).

Theretra rosina, Kirby, *l.c.* n. 33 (1892) (N. India); Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 21 (1895) (Java).

Theretra prunosa, Kirby, *l.c.* n. 34 (1892) (Ceylon).

Chaerocampa japonica, Piepers (*non* Orza, 1867), *Tijdschr. Ent.* xl. p. 42. n. 86. t. 1. f. 6. 7, t. 4. f. 7 (1897) (Java, larva: cit. Boisd. excl.).

♂ ♀. The pale dorsal double line of the abdomen becomes indistinct posteriorly. The brown discal band of the forewing is formed by two separate lines, lines 1 and 2 being fused together; line 5 heavy, 7 also rather prominent. The reddish band of the hindwing varies in width; if the reddish scaling is extended in a basal direction, one or two, seldom three, brown lines become visible. External row of spines of first protarsal segment trebled by additional spines.

♂. Tenth tergite stout, rather strongly curved at end, apex sinuate; sternite pointed, broadly triangular, sides obliquely rounded. Process of harpe horizontal, apically slightly dilated. Armature of penis-sheath peculiar (Pl. LVIII. f. 9. 10): the right process enlarged, with two ridges of teeth, the left lobe reduced to a long pointed process which bears traces of teeth.

♀. Vaginal armature asymmetrical (Pl. XLI f. 17), the ridge in front and at the sides of the vaginal cavity at the right side gradually fading away, while at the same side another ridge extends into the cavity.

Larva with a complete series of ocelli; the ocelli are pale with a black ring in the stage figured by Piepers, *l.c.*

Hab. Ceylon to N.W. India and eastwards to Java.

In the Tring Museum 9 ♂♂, 3 ♀♀ from: Ceylon; Sikhim; Bassein; Penang, i. (Curtis); Java.

734. Theretra monteironis.

**Chærocampa monteironis* Butler, *Ann. Mag. N. H.* (5). x. p. 433 (1822) (Delagoa B.;—Mus. Brit.). *Theretra monteironis*, Kirby, *Cat. Lep. Het.* i. p. 652. n. 45 (1892).

♂ ♀. The blackish discal band of the forewing is formed by two separate lines only, line 1 being fused with 2; line 5 heavy. On the hindwing there is a vestigial pale band, including mostly a very indistinct brown line, proximally of which another line is occasionally visible. The dorsal lines of the abdomen are quite as obscure as in *japonica*.

♂. Tenth abdominal tergite slender, rather strongly curved, apex rounded, upperside convex but not carinate; sides of sternite almost parallel, apex truncate, with the angles rounded. Process of harpe first horizontal, then curving evenly and slightly ventrad and distally dorsad, apex slightly widened in dorsal view. Armature of penis-sheath: the right process a pointed conical tooth, the left band-like, widest distally, narrowing towards the end, being elongate-triangular, resembling the blade of a knife, the proximal edge minutely and densely dentate, the distal edge without teeth.

Early stages not known.

Hab. East Africa: Natal; Delagoa Bay.

In the Tring Museum 5 ♂♂, 1 ♀ from Natal.

735. Theretra cajus.

Sphinx cajus Cramer, *Pap. Exot.* ii. p. 80. t. 146. f. r (1777) (Cap. b. sp.).

♂ ♀. The two white lines of the abdomen are fused together at the base and apex of each segment, as is sometimes the case in *oldenlandiæ*, forming a kind of chain. The forewing has a black subbasal streak behind M. On the hindwing there is a distinct discal line preceded proximally by another line, which is, however, generally lost in the brown discal area; the submarginal line is in most specimens distinct, the marginal band being shaded with grey.

♂. Tenth tergite shorter and broader than in the preceding species, less convex

above, apex rounded; sternite broad, sides somewhat obliquely rounded, apex narrowed to an obtuse point. Process of harpe slender, horizontal, distally gradually curved dorsad. Band-like armature of penis-sheath: the left lobe rather shorter than in *oldenlandiae*, with heavy teeth at the proximal edge, with few teeth at the distal edge (Pl. LVII. f. 42).

♀. The anterior and lateral edge of the cavity raised, smooth, halfmoon-shaped.

Larva not known.

Hab. Africa.

Two subspecies:

a. Th. cajus perkeo subsp. nov.

♂. Paler than the following form; discal line 5 of forewing above not distinctly heavier than line 6; hindwing without distinct brown discal line. Tenth abdominal tergite slenderer.

Length of forewing: 22 mm.

Hab. Ogrugu, Niger.

One ♂ in Tring Museum.

Another specimen, also a ♂, in the British Museum from Pt. Lokkoh, Sierra Leone, differs from the *type* in the fourth discal line of the forewing being thinner, vestigial, in the white dorsal line of the abdomen not being divided, and in the hindwing being paler.

b. Th. cajus cajus.

Sphinx cajus Cramer, *l.c.* (1777) (Cap. b. sp.); Goeze, *Ent. Beytr.* iii. 2. p. 222. n. 65 (1780).
Sphinx celaeno Esper, *Ausl. Schm.* ii. p. 203. t. 28. f. 2 (1782).
Sphinx gordius Stoll, in Cram., *Pap. Exot.* iv. p. 147. t. 367. f. A (1782).
Xylophanes gortys Hübner, *Verz. bek. Schm.* p. 136. n. 1458 (1822).
Xylophanes cajus, id., *l.c.* p. 136. n. 1459 (1822).
Chaerocampa gordius, Walker, *List Lep. Ins. B. M.* viii. p. 138. n. 19 (1856).
Chaerocampa cajus, id., *l.c.* viii. p. 139. n. 20 (1856); Butl., *Trans. Zool. Soc. Lond.* ix. p. 558. n. 26 (1877) (= *celaeno* ?).
Chaerocampa epirles Boisduval, in Deleg., *Voy. Afr. Austr.* p. 595. n. 108 (1847) (Zululd., *nom. nud.*); id., *Spec. Gén. Lép. Hét.* i. p. 244. n. 23 (1875) (Cape; Caffr.); Moschl., *Verh. Zool. Bot. Ges. Wien* xxxiii. p. 287. n. 81 (1884) (= *gordius*; Caffraria).
Chaerocampa cajus, Boisduval, *l.c.* i. p. 245. n. 24 (1875).
Chaerocampa celaeno, Butler, *l.c.* ix. p. 558. n. 25 (1877) (Natal: Zululd.; Cape).
Theretra cajus, Kirby, *Cat. Lep. Het.* i. p. 653. n. 35 (1892) (= *celaeno* = *gordius* — *gortys* = *epirles*).

♂♀. Line 5 of forewing above much heavier than line 6; brown discal line of hindwing above distinct.

Hab. South and South East Africa.

In the Tring Museum 24 ♂♂, 12 ♀♀ from: Cape Colony; Natal.

736. Theretra oldenlandiae.

Sphinx oldenlandiae Fabricius, *Syst. Ent.* p. 542. n. 21 (1775) (Ind.); Goeze, *Ent. Beytr.* iii. 2. p. 207. n. 12 (1780); Fabr., *Spec. Ins.* ii. p. 118. n. 37 (1781); id., *Mant. Ins.* ii. p. 96. n. 41 (1787); Gmel., *Syst. Nat.* i. 5. p. 2381. n. 75 (1790); Fabr., *Ent. Syst.* iii. 1. p. 370. n. 41 (1793); Lewin, *Ins. N. S. Wales* p. 4. t. 3 (1822); Thon, *Ent. Arch.* i. p. 6. t. 1. f. 3 (1828).
Sphinx draneus Cramer, *l.c.* ii. p. 56. t. 132. f. C (1777) (E. Ind.).
Chaerocampa oldenlandiae, Walker, *List Lep. Ins. B. M.* viii. p. 142. n. 25 (1856).
Chaerocampa oldenlandiae, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 241. n. 22 (1875).
Chaerocampa draneus, id., *l.c.* p. 263. n. 49 (1875).
Theretra draneus, Kirby, *Cat. Lep. Het.* i. p. 654. n. 38 (1892).
Chaerocampa lycetus, Hampson, *l.c.* p. 87. n. 124 (1892) (sub syn.).

♂♀. The two lines of the abdomen are sometimes partly fused together; occasionally there are only a few brown scales separating them here and there. Lines of forewing as in *margarita*, but line 4 nearly always distinct, interspace between 4 and 5 not quite so pale as that between 3 and 4, which is more or less silvery; line 5 always heavy, 6 thin but distinct. The pale band of the hindwing varies in tint and distinctness; it is sometimes very faint.

Cramer's figure of *draneus* applies to this species; the type specimen is preserved in the Tring Museum (ex coll. Felder from coll. Lennep); the single white abdominal line drawn by Cramer is excusable, as the lines are very incompletely separated in the specimen, being, in fact, merged together except here and there; the hindwing has no distinct pale band; both hindwings are repaired.

♂. Tenth segment as in *margarita*, the sternite with an obvious mesial tooth. Process of harpe feebly curved, spatulate in dorsal view. Band-like armature of penis-sheath broader than in *margarita* and longer, the teeth less prominent, the process at the right side rather short.

Larva black, with a row of yellow spots on each side of the thoracic tergites; a series of seven eye-spots of about the same size, the first two with black centres; horn long and slender.

Hab. Oriental Region.

We have not seen *oldenlandiae* from the Bismarck Archipelago and the Solomons, where one should expect it to occur.

Two subspecies:

a. Th. oldenlandiae oldenlandiae.

Sphinx oldenlandiae Fabricius, *l.c.* (1775).

Sphinx draneus Cramer, *l.c.* ii. p. 56. t. 132. f. F (1777).

Sphinx argentata Haworth, *Trans. Ent. Soc. Lond.* i. p. 334 n. 12 (1812) (*nom. nud.*).

Xylophanes draneus, Hübner, *Verz. bek. Schm.* p. 136. n. 1460 (1822).

Xylophanes gortys id., *Samml. Exot. Schm., Zutr.* iii. p. 28. n. 257. fig. 513. 514 (1825) (Bat.).

Deilephila argentata, Stephens, *Illustr. Brit. Ent., Haust.* i. p. 130. note (1828); id., *Cat. Brit. Ins.* ii. p. 33 (1829); Wood, *Ind. Ent.* p. 247. n. 28. t. 53. f. 28b (1839).

Chaerocampa draneus, Walker, *List Lep. Ins. B. M.* viii. p. 133. n. 9 (1856); Butl., *Trans. Zool. Soc. Lond.* ix. p. 559. n. 28 (1877); Cot. & Swinh., *l.c.* p. 16. n. 89 (1887).

Chaerocampa oldenlandiae, Walker, *l.c.* (1856) (partim); Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 278. n. 644. t. 11. f. 4. a (*l.*) (1857); Walk., *Journ. Linn. Soc. Lond.* vi. p 84. n. 9 (1862) (Sarawak); Semp., *Verh. Zool. Bot. Ges. Wien* xvii. p. 700. n. 1 51867) (larva); Snell., *Tijdschr. Ent.* xx. p. 2. n. 5 (1877) (Java); Butl., *Trans. Zool. Soc. Lond.* ix. p. 559. n. 29. t. 91. f. 1 (*l.*) (1877); Kirby, *Trans. Ent. Soc. Lond.* p. 235 (1877); Snell, *l.c.* xxii. p. 65. n. 12 (1877) (S. Celebes); Butl., *Proc. Zool. Soc. Lond.* p. 670. n. 34 (1880) (Formosa); id., *l.c.* p. 613 (1881) (Kurachi, xii.); Fors., *Trans. Ent. Soc. Lond.* p. 390 (1884) (Mhow, life hist.); Swinh, *Proc. Zool. Soc. Lond.* p. 514. n. 7 (1884) (Kurachi, xii.); id., *l.c.* p. 289. n. 14 (1885 (Poona, vi.; Bombay; Belgaum); id., *l.c.* p. 434. n. 8 (1886) (Mhow, vii. ix.); Pagenst., *Iris* i. p. 86. n. 5 (1886) (Aru); id., *Jahrb. Nass. Ver. Nat.* xxxix. p. 111. n. 5 (1886) (Aru); Cot. & Swinh., *Cat. Moths Ind.* i. p. 16. n. 90 (1887); Swinh., *Journ. Bombay N. H. Soc.* iii. p. 118. n. 7 (1888) (= *gortys*; Karachi, xii.); Leech, *Proc. Zool. Soc. Lond.* p. 584. n. 15 (1888) (Yokohama); Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 107. n. 204 (1888) (Amboina); Swinh., *Trans. Ent. Soc. Lond.* p. 163. n. 13 (1890) (Thyetmyo); Pagenst., *l.c.* xliii. p. 101. n. 177 (1890) (E. Java); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 20. n. 76 (1892) (" White Nile and Melville I." excl.); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 87. n. 125 (1892); Pagenst., *l.c.* xlvii. p. 58 (1894) (Sumba); id., *l.c.* xlix. p. 155. n. 117 (1896) (Sumba); Semp., *Schm. Philipp.* ii. p. 395. n. 32. t. E. f. 7. 8 (*l., p.*) (1896) (Luzon; Bohol; Mindanao); Piep., *Tijdschr. Ent.* xl. p. 97. 99. f. 226 (horn of *l.*) (1897); Leech, *Trans. Ent. Soc. Lond.* p. 283. n. 51 (1898) (= *proxima*); Nurse, *Journ. Bombay N. H. Soc.* xii. p. 513 (1899) (Cutch); Staud. & Reb., *Cat. Lep.* ed. iii. p. 103. n. 755 (1901).

(?) *Chaerocampa sobria* Walker, *l.c.* viii. p. 148. sub n. 36 (1856).

Choerocampa oldenlandiae, Boisduval, *l.c.* (1875) (partim).
**Chaerocampa puellaris* Butler, *Proc. Zool. Soc. Lond.* p. 623. n. 2 (1875) (Rawul Pindi ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 638 (1877) ; Cot. & Swinh., *l.c.* i. p. 17. n. 92 (1887).
Xylophanes oldenlandiae, Moore, *Lep. Ceylon* ii. p. 17. t. 85. f. 1. 1. a (1883).
Deilephila proxima Austaut, *Le Natural.* p. 69 (1892) (Japan).
Theretra oldenlandiae, Kirby, *Cat. Lep. Het.* i. p. 653. n. 37 (1891) ; Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 22 (1895) (Java); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 412. n. 125 (1898) (Sikhim, 1800 ft. ; Bhutan, 2500—3000 ft. ; vi.—ix.).
Theretra puellaris, Kirby, *l.c.* i. p. 654. n. 39 (1892).
Theretra proxima, id., *l.c.* p. 931. n. 116 (1892).
Deilephila oldenlandiae, Bartel, in Rühl, *Grossschm.* ii. p. 108 (1900).

♂ ♀. Individuals from Celebes are mostly darker in tint than those from other localities, both the fore- and the hindwing being much shaded with blackish brown. Individually variable in size. In Japan, China, and the Himalayas there is possibly a smaller and paler spring form.

Hab. Ceylon, N.W. India to Japan, eastwards to New Guinea.

In the Tring Museum 3 larvae, 1 pupa, 120-odd specimens from : Ceylon ; South, N. West, and North India ; China ; Japan ; Formosa ; Penang ; Sumatra ; Borneo ; Philippines ; Celebes ; Java ; Sumba ; Amboina ; Kei ; German and British N. Guinea.

b. Th. oldenlandiae firmata.

Deilephila oldenlandiae, Boisduval, in *Voy. Astrolabe* p. 184 (1832) (Sidney ; larva descr.) ; Feisth., in *Voy. Favorite* p. 18 (1839) (Austral.).
Chaerocampa oldenlandiae, Walker, *l.c.* (1856) (partim) ; Koch, *Indo-Austral. Lep. Fauna* p. 53 (1865) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 12. n. 18 (1891) (partim).
**Chaerocampa firmata* Walker, *l.c.* p. 148. n. 36 (1856) (Australia ;—Mus. Brit.) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 20. n. 77 (1892) (N. S. Wales).
Chaerocampa lycetus, Herrich-Sch. (*non* Carmer, 1775), *Aussereur. Schm.* ii. f. 557 (1869).
Choerocampa oldenlandiae, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 242. n. 22 (1875) (partim).
**Chaerocampa argentata* Butler (*non* Stephens, 1828), *Proc. Zool. Soc. Lond.* p. 8. n. 15. t. 2. f. 3 (1875) (Moreton B. ; Sydney ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 559. n. 30 (1877) (Moreton B. ; Sydney ; N. Austr.).
Theretra firmata, Kirby, *Cat. Lep. Het.* i. p. 654. n. 40 (1892).

♂ ♀. Rather reddish in tint, especially the pale band of the hindwing ; sides of abdomen tawny ; interspace between lines 4 and 5 on the forewing above generally more white than in the preceding.

Hab. Australia : N. S. Wales ; Queensland ; N.W. Australia.

In the Tring Museum 5 larvae, 8 ♂♂, 17 ♀♀ from : Mackay ; Dawson River; Townsville ; Brisbane ; Pt. Darwin.

737. Theretra pinastrina.

Sphinx pinastrina Martyn, *Psyche* t. 29. f. 81. t. 30. f. 85 (1797) (hab.?).
Choerocampa silhetensis, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 240. n. 19 (1879) (India ; Java ; Manila ; Celebes).
Chaerocampa pinastrina, Miskin, *Proc. Roy. Soc. Queensld.* viii. p. 11. n. 16 (1891) (Brisbane ; Rockhampton ; Java ; India ; Ceylon).

♂ ♀. *Upperside*, forewing : a brown oblique discal band as in *oldenlandiae* ; line 4 more distinct ; interspace between 3 and 4 more or less silvery, the broader interspace between 4 and 5 *not* silvery. The amount of black on the hindwing variable ; there is sometimes a narrow discal band consisting of two indistinct lines, besides the marginal band. One white line on abdomen.

♂. Tenth tergite less curved than in *margarita*, more strongly compressed apically; sternite also ribbed at the edges above, and the apical margin notched, less distinctly bisinuate. Harpe slenderer and longer than in *margarita*, less curved. Band-like armature of penis-sheath narrower and longer.

Larva: a green and a brown form; seven eye-spots of equal size, with green resp. black centres; dorso-lateral line not interrupted into dots on thorax.—Food-plants: *Balbas; Boerhavia*.

Hab. Oriental Region.

Two subspecies, which are not very conspicuously different.

a. Th. pinastrina pinastrina.

Sphinx pinastrina Martyn, *l.c.*

**Chaerocampa silhetensis* Walker, *List Lep. Ins. B. M.* viii. p. 143. n. 27 (1856) (partim;—Mus. Brit.); Walk., *Journ. Linn. Soc. Lond.* vi. p. 84. n. 10 (1862) (Sarawak): Schauf., *Nunq. Otios.* i. p. 17 (1870) (this spec.?); Butl., *Proc. Zool. Soc. Lond.* ix. p. 560. n. 32. t. 92. f. 8 (*l., p.*) (1877) (Ceylon; N. India; Silhet; Borneo; Java); Snell., *Tijdschr. Ent.* xx. p. 2. n. 6 (1877) (Java); id., *l.c.* p. 67 (1877) (Sumatra); Butl., *Proc. Zool. Soc. Lond.* p. 815. n. 43 (1877) (Formosa); id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 8. t. 79. f. 6 (1881); Cot. & Swinh., *Cat. Moths Ind.* i. p. 17. n. 93 (1887); Leech, *Trans. Ent. Soc. Lond.* p. 120. n. 100 (1889) (Kiukiang); Swinh., *ibid.* p. 163. n. 14 (1890) (Pegu); id., *Cat. Lep. Het. Mus. Ox.* i. p. 19. n. 74 (1892); Snell., in Snell., *Fauna Midden-Sumatra* ii. p. 29 (1892); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 88. n. 126 (1892); Piep., *Tijdschr. Ent.* xl. p. 97. f 4. (horn of *l.*) (1897); Leech, *l.c.* p. 284. n. 53 (1898) (Kiukiang; Loo Choo Is.).

**Chaerocampa bisecta* Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 278. n. 645. t. 11. f. 5. 5a (1857) (Java: N. India:—Mus. Brit.); id., *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal).

Chaerocampa silhetensis, Boisduval, *l.c.* (1875) (partim).

Xylophanes pinastrina, Moore, *Lep. Ceylon* ii. p. 18. t. 87. f. 2 (1882).

Theretra pinastrina, Kirby, *Cat. Lep. Het.* i. p. 654. n. 44 (1892); Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 23 (1895) (Java).

Theretra silhetensis, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 412. n. 126 (1898) ("not seen").

♂ ♀. Interspace between lines 4 and 5 on the upperside of the forewing broad; line 5 heavier than 6.

Hab. Ceylon to Japan, eastwards to Borneo and Java.

In the Tring Museum 60-odd specimens from: Ceylon; N. India; Burma; Formosa; Penang; Sumatra; Borneo; Java.

b. Th. pinastrina intersecta.

**Chaerocampa intersecta* Butler, *Proc. Zool. Soc. Lond.* p. 623. n. 3 (1875) (Queensland;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 638 (1877).

Chaerocampa silhetensis, Snellen, *Tijdschr. Ent.* xxii. p. 65. n. 11 (1877) (S. Celebes); Pagenst., *Jahrb. Nass. Ver. Nat.* xli. p. 107. n. 204 (1888) (Amboina).

Theretra intersecta, Kirby, *Cat. Lep. Het.* i. p. 654. n. 42 (1892).

Chaerocampa pinastrina, Miskin, *l.c.* (1891) (partim; Rockhampton; Brisbane); Semper, *Schm. Philipp.* ii. p. 396. n. 33. t. v. f. 1. 2 (*l., p.*) (1896) (Luzon; Bohol; Sulu; Palawan).

Theretra silhetensis, Pagensteeher, *Abh. Senk. Nat. Ges.* xxiv. p. 444. n. 426 (1897) (Celebes); id., in Chun, *Zoologica* xii. 29. p. 13. n. 9 (1900) (Mioko; Shortland Is.).

♂ ♀. Interspace between lines 4 and 5 on upperside of forewing narrower than in preceding form; line 5 not heavier than 6.

Hab. Papuan Subregion, westward to the Philippines, Celebes, Sumba.

In the Tring Museum 4 larvae, 40-odd specimens from: Queensland; New Guinea; Solomon Is.; Bismarck Archipelago; Amboina; Manila; Celebes; Djampea; Sumba.

738. Theretra margarita.

**Chaerocampa margarita* Kirby, *Trans. Ent. Soc. Lond.* pp. 235. 240 (1877) (Queensland ;—Mus Dublin) ; Waterh., *Ahl Ident. Ins.* ii. t. 140. f. 2 (1883).

Chaerocampa phoenix, Miskin (*non* Koch, 1865), *Proc. Roy. Soc. Queensld.* viii. p. 12. n. 17 (1891) (Brisbane : Rockhampton).

Chaerocampa marginata (!), Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 19. n. 73 (1892) (cit. falsa !).

Theretra margarita Kirby, *Cat. Lep. Het.* i. p. 654. n. 41 (1892).

Miskin says that this is *phoenix* of Koch (not Oken, 1815) ; he received the name to specimens sent by him to Koch. However, in 1865 Koch himself says that *phoenix* is the same as *rigil* (= *relox* = *lignaria* = *yorki*, etc.). But even if the insect named by Koch *phoenix* in 1865 was not the *phoenix* of Herrich-Schäffer (= *rigil* = *lignaria* = *relox*, etc.), but the present species *margarita*, the name *phoenix* could not be employed instead of *margarita*, as there was no description given in 1865, and as Koch did not mean to publish a new name for a new insect, but simply applied Herrich-Schäffer's name *phoenix* (which is not Oken's *phoenix* = *celerio*) to the insect which he identified as Herrich-Schäffer's. Koch may very likely have misidentified later on the present species as *phoenix*. He was not very careful in this respect. See his remark about *serofa*.

♂ ♀. Very close to the following insect. Forewing : lines 1, 2, 3 forming a brown band, 4 obsolete, interspaces between lines 3 and 5 silvery white, at least behind, line 5 heavy, stigma vestigial. Grey mesial band of thorax much broader than in *pinastrina*.

♂. Tenth tergite slender, rather strongly curved, subcarinate above, apex convex above, rounded-truncate, not distinctly sinuate ; sternite truncate, slightly bisinuate, the middle lobe dentiform, upperside transversely ribbed at the margins. Process of harpe widened in middle, then evenly and rather strongly curved, spatulate in a dorsal view. The ribbon-like armature of the penis-sheath (Pl. LVII. f. 39. 40) broad, dentate at both edges sinistro-laterally.

Early stages not known.

Hab. Australia : Queensland.

In the Tring Museum 4 ♂♂, 4 ♀♀ from : Brisbane ; Dawson R. (Barnard) ; Townsville (Dodd).

739. Theretra brunnea.

**Chaerocampa brunnea* Semper, *Schm. Philipp.* ii. p. 400. n. 40. t. 52. f. 1 (♀) (1896) (S.E. Mindanao :—coll. Semper).

**Panacra baruensis* Rothschild, Nov. Zool., vi. p. 69. n. 7 (1899) (Buru ; Mus. Tring) ; id., *l.c.* vii. p. 274. n. 4. t. 5. f. 3 (♀) (1900).

♀. The slight differences between Semper's and our specimen are most likely individual. The species differs from *turneri* and *insignis* especially in the mesothoracic tegula being devoid of a pale median stripe. Antenna incrassate distally as in the allied species.

Hab. Mindanao ; Buru.

In the Tring Museum 1 ♀ from Buru.

740. Theretra turneri.

Panacra turneri Lucas, *Queenslander* xxxix. p. 894 (May, 1891) ; Misk., *Proc. Roy. Soc. Queensld.* viii. p. 62 (1891) (Mackay) ; Kirby, *Cat. Lep. Het.* i. p. 663. n. 16 (1892) ; id., Nov. Zool., i. p. 37. n. 17 (1894) ; Rothsch., *ibid.* iii. p. 23 (1896) (= *mira*).

**Panacra mira* Swinhoe, *Cat. Lep. Het. Mus. Ox.* i. p. 13. n. 54. t. 1. f. 6 (1892) (C. York : Mus. Oxford) ; Kirby, *l.c.* n. 12a (1894).

♂ ♀. Cavity of palpus partly concealed by rough scaling. Antenna somewhat clubbed, especially in ♀. External spines of first protarsal segment rather long, the row doubled, with some additional short spines.

♂. Tenth segment as in *margarita*, the apex of the sternite more rounded, not distinctly bisinuate. Friction-scales of clasper large; process of harpe long, slender, feebly spatulate, curving upwards at end. Penis-sheath similar to that of *margarita* and allies, the right process short, narrow, paucidentate, the ribbon-like armature broadest at its most distal point, the dentate ridge beginning close to the right process (Pl. LVIII. f. 26, dorsal view), the distal edge of the ribbon dentate as in *margarita*.

♀. Vaginal plate rounded triangular, very obtuse; anterior edge of the vaginal cavity raised into a smooth ridge, which forms a kind of half-cylinder over the cavity, and gradually disappears distally.

Early stages not known.

Hab. Queensland.

In the Tring Museum 8 ♂♂, 10 ♀♀ from: Brisbane and Townsville (Dodd); Cooktown; Mackay (Turner).

741. Theretra insignis.

**Panacra insignis* Butler, *Ann. Mag. N. H.* (5). x. p. 432 (1882) (Andamans;—Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 663. n. 12 (1892) (Andamans).

♂ ♀. Structurally not different from *turneri*, except that the right process of the penis-sheath is longer in *insignis*. The sharply marked narrow pale band which runs from near the apex of the forewing to the middle of the hinder margin, and forms an obtuse angle in middle, is a conspicuous distinguishing character of *insignis*.

Early stages not known.

Hab. Andamans to Tenimber.

Two subspecies:

a. Th. insignis insignis.

**Panacra insignis* Butler, *l.c.*

♂. Differs from the following form in being larger, having the forewings more pointed and the pale band less curved in middle.

Hab. Andamans.

One ♂ in the British Museum.

b. Th. insignis kuehni.

**Theretra insignis*, Snellen, *Tijdschr. Ent.* xxviii. p. 252. t. 9. f. 1 (1885) (Java).

**Chaerocampa kühni* Rothschild, Nov. Zool. vii. p. 274. n. 2. t. 5. f. 2 (♂) (1900) (Dammer I.;—Mus. Tring).

The Java specimen figured by Snellen approaches a little the Andaman form.

Hab. Tenimber; Dammer I.; Java.

In the Tring Museum 3 ♂♂, 4 ♀♀ from: Dammer I., xii. (Kühn); Larat, Tenimber (Kühn).

742. Theretra griseomarginata.

**Chaerocampa griseo-marginata* Hampson, *Journ. Bombay N. H. Soc.* xi. p. 281. n. 130a. t. A. f. 12 (♀) (1898) (Sikhim, 1800 ft.;—Mus. Brit.); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 411. n. 130a (1898) (Sikhim, at light, 1800 ft.).

♂♀. A rare insect: we have seen only two specimens. Antenna long, reaching beyond end of cell of forewing. External row of spines of first segment of foretarsus double. White mesial line of abdomen simple. A whitish submarginal band on forewing above nearly straight from apex to near hinder angle.

Early stages not known.

Hab. Sikhim.

A ♀ in the British Museum; a ♂ in coll. Charles Oberthür.

743. Theretra orpheus.

**Chaerocampa orpheus* Herrich-Schäffer, *Aussereur. Schm.* i. f. 104 (1854) (Cape of Good Hope;— coll. Standinger).

♂♀. Antenna clubbed as in the three preceding species. Cavity of palpus sharply defined, the scaling around it more regular than in *turneri*, etc. Long spurs of hindtibia shorter than usual; bristles of midtarsal comb long. Cross-veins of hindwing straight, D^2 not or very feebly curved.

♂. Tenth tergite as in the allied species, but feebly dilated at the end, which is rounded-truncate and faintly sinuate; sternite narrow, rounded at end, with a minute mesial tooth. Clasper with one single large scale, which is obtuse at end: harpe short, without free process (Pl. LII. f. 23). Penis-sheath without armature; the dorsal edge produced into a lobe, which is bent into the interior of the cylinder.

♀. Vaginal plate triangular, narrowly truncate; vaginal cavity a little before middle, its anterior edge raised, more strongly chitinised than the sides, with some longitudinal wrinkles; no separate lobes.

Early stages not known.

Hab. Aethiopian Region: Continental Africa; Comoro Is.

Three subspecies:

a. Th. orpheus pelius subsp. nov.

Chaerocampa orpheus, Möschler, *Abh. Senk. Nat. Ges.* xv. p. 68. n. 152 (1890) (Accra, v.).

♂. A pale and narrow-winged form. Sides of basal segments of abdomen scarcely deeper brown than the other segments; middle stripe of mesothoracic tegula greenish olive.——First discal line of forewing thin, not heavier than second; lines in basal third of wing thinner than in the following subspecies, disc washed with greenish olive, this colour more obvious between upper angle of cell and discal lines, where the wing is russet or Prout's brown in *orph. orpheus*.—— Hindwing and underside of both wings paler than in the following.

Hab. West Africa.

In coll. Charles Oberthür 1 ♂ (*type*) from Johann Albrechts Höhe, Cameroons (Conradt).

b. Th. orpheus orpheus.

Chaerocampa orpheus Herrich-Schäffer, *l.c.* (1854) (Cape); Walk., *List Lep. Ins. B. M.* xxxi. p. 30 (1864).

Chaerocampa orpheus, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 247. n. 27 (1875).

Panacra orpheus, Butler, *Trans. Zool. Soc. Lond.* ix. p. 550. n. 10 (1877).

Panacra (?) *orpheus*, Kirby, *Cat. Lep. Het.* i. p. 662. n. 5 (1892).

**Panacra natalensis* Rothschild, Nov. Zool. i. p. 79. t. 5. f. 13 (1894) (Natal; — Mus. Tring).

Panacra orphaeus (!), Distant, *Ann. Mag. N. H.* (7). t. iii. p. 180 (1899) (Delagoa Bay: — *variolosa* = *raptus* ex errore !).

♂♀. Forewing washed with Prout's brown or russet at inner margin proximally and distally of pale discal double line, and also between upper angle of cell and discal lines.

Hab. South Africa: Cape Colony; Natal.

In the Tring Museum 7 ♂♂, 2 ♀♀ from Natal.

c. Th. orpheus intensa subsp. nov. (Pl. V. f. 13, ♂).

♂. Darker and broader-winged than the previous. Lines of upperside of abdomen and forewing less distinct; pale band of forewing conspicuous behind, where it is creamy, and costal margin not pale beyond apex of cell. Underside of wings: ground-colour cinnamon-rufous, lines of forewing thinner than in the preceding forms.

Hab. Grande Comore (L. Humblot).

One ♂ (*type*) in coll. Charles Oberthür, here figured; a second ♂ kindly given to the Tring Museum.

744. Theretra pallicosta.

**Chaerocampa pallicosta* Walker, *List Lep. Ins. B. M.* viii. p. 145. n. 31 (1856) (Silhet; Hongkong;—Mus. Brit.); Moore, *Proc. Zool. Soc. Lond.* p. 676 (1867); Butl., *Trans. Zool. Soc. Lond.* ix. p. 566. n. 75 (1877); id., *Illustr. Typ. Specim. Lep. Het. B. M.* iii. p. l. t. 41. f. 2 (1879); Cot. & Swinh., *Cat. Moths Ind.* i. p. 20. n. 106 (1887); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 15. n. 60 (1892) (Silhet: Assam; Ceylon); Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 94. n. 144 (1892) (Ceylon; Assam; Silhet; E. Pegu; Hongkong).

Chaerocampa callicosta (!), Ménétriés, *Enum. Corp. Anim. Mus. Petr., Lep.* ii. *Suppl.* p. 91 n. 1515 (1857).

Gnathothlibus pallicosta, Moore, *Lep. Ceylon* ii. p. 21. t. 84. f. 6 (1882).

Theretra pallicosta, Kirby, *Cat. Lep. Het.* i. p. 659. n. 112 (1892); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 415. n. 144 (1898) ("not seen").

♂♀. Opening of palpus partly covered by single long scales of the first and second segments. External row of spines of the first protarsal segment doubled and trebled. Thorax with a white mesial line. Lines of forewing straight, nearly parallel to margin, one only distinct and this dentate; costal edge and stigma buffish white.

♂. Tenth abdominal segment of the ordinary shape, tergite feebly sinuate, sternite rather narrow, pointed. Clasper with 10-odd large scales; harpe long, slender, horizontal, apex rounded in dorsal view, flattened. Penis-sheath: apical edge dorsally rounded-produced, symmetrical; on the right and the left side a dentate process pointing proximad, the left process the slenderer and slightly longer.

Early stages not known.

Hab. Ceylon to Burma and Hongkong.

In the Tring Museum 9 ♂♂, 6 ♀♀ from: Ceylon; Karwar; Khasia Hills; Jaintia Hills, Burma.

745. Theretra castanea.

**Pergesa castanea* Moore, *Proc. Zool. Soc. Lond.* p. 566 (1872) (Bombay;—Mus. Brit.); Butl., *Trans. Zool. Lond.* ix. p. 549. n. 10 (1877); Waterh., *Aid Ident. Ins.* i. t. 56 (1881); Swinh., *Proc. Zool. Soc. Lond.* p. 288. n. 7 (1885) (Sattara, vi.); Cot. & Swinh., *Cat. Moths Ind.* i. p. 10. n. 57 (1887).

Metopsilus castaneus, Kirby, *Cat. Lep. Het.* i. p. 661. n. 17 (1892) (Bombay).

Charrocampa castanea, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 92, n. 138 (1892) (Bombay ; Satara).

**Charrocampa hyporhoda* Hampson, *Journ. Bombay N. H. Soc.* xiii. p. 39, n. 138a, t. c, f. 12 (1900) (Karwar ;—Mus. Brit.).

♂♀. Somewhat variable in colour above and below. Palpus as in *pallicosta*. External row of spines of first protarsal segment single, except at base, where there are some additional spines. The upperside sometimes more, sometimes less reddish ; underside varying from orange-rufous to pale tawny.——Forewing, above, with greyish marginal area, which is widest at R^2 ; stigma black, discal lines very indistinct, the distal one indicated by more or less vestigial vein-dots.——Hindwing uniformly dark tawny-olive or blackish, fringe white between M^2 and SM^2.

Hab. South India.

The species leads over to *Rhagastis*, which it resembles very much in shape and in the style of coloration.

In the Tring Museum 3 ♀♀ from Travancore ; 1 ♂ from Karwar.

CLXIII. RHYNCHOLABA gen. nov.—Typus : *acteus*.

Sphinx, Cramer (*non* Linné, 1758), *Pap. Exot.* iii. p. 93 (1779).
Orcus Hubner, *Verz. bek. Schm.* p. 136 (1862) (partim ; type : *gnoma*).
Pergesa Walker, *List Lep. Ins. B. M.* viii. p. 153 (1856) (partim ; type : *porcellus*).
Charrocampa, Boisduval (*non* Duponchel, 1835), *Spec. Gén. Lép. Hét.* i. p. 257 (1875) (partim).
Metopsilus, Kirby (*non* Duncan, 1836), *Cat. Lep. Het.* i. p. 660 (1892) (partim).
Theretra, Hampson (*non* Hübner, 1822), in Blanf., *Fauna Brit. Ind., Moths* i. p. 100 (1892) (partim)
Panacra, Rothschild (*non* Walker, 1856), Nov. Zool. i. p. 80 (1894) (partim).

♂♀. Second segment of palpus triangular ; the joint widely open, some dispersed long scales on the naked space of the opening ; scaling of first segment longest just below the opening, the palpus thus differing in outline (Pl. LIX. f. 25) from that of every other Sphingid. Mid- and hindtibia short-scaled ; basal spines of midtarsal comb prolonged, longer than the segment is thick ; hindtarsus also with prominent comb.

Larva : anterior segments small ; a very large eye-spot on fourth segment, followed by a series of smaller, oblique, ovate spots ; horn short.

Pupa with a long free tongue-case, the end of which rests against the breast fitting in a groove.

Hab. Indo-Malayan Subregion.

One species.

Connected with the bulk of *Theretra* by *Th. nessus*, with which *Rhyncholaba* agrees in many respects. The free tongue-case of the pupa is a character not found anywhere else among the *Sphingidae semanophorae*.

746. Rhyncholaba acteus.

Sphinx acteus Cramer, *Pap. Exot.* iii. p. 93, t. 248, f. A (1779) (Java).
Orcus acteus, Hübner, *Verz. bek. Schm.* p. 136, n. 1464 (1822).
Pergesa acteus, Walker, *List Lep. Ins. B. M.* viii. p. 153, n. 6 (1856) (Borneo ; Java ; Moulmein ; Silhet ; N. India ; Ceylon) ; Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* p. 272, n. 629, t. 10, f. 1, 1 a (*l., p.*) (1857) (Java ; N. India) ; Moore, *Proc. Zool. Soc. Lond.* p. 791 (1865) (Bengal), Semper, *Verh. Zool. Bot. Ges. Wien* xvii. p. 699, n. 11 (1867) (larva) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 548, n. 3 (1877) ; Moore, *Proc. Zool. Soc. Lond.* p. 595 (1877) (Pt. Blair) ; Snell., *Tijdschr. Ent.* xx. p. 2, n. 9 (1877) (Java) ; Butl, *Proc. Zool. Soc. Lond.* p. 613 (1881)

(Belgaum) ; Moore, *Lep. Ceylon* ii. p. 23. t. 88. f. 1. 1a (*l., p., i.*) (1882) ; Swinh., *Proc. Zool. Soc. Lond.* p. 288. n. 8 (1885) (Poona, i. ii. ; Belgaum ; Bombay) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 10. n. 53 (1887) ; Swinh., *Trans. Ent. Soc. Lond.* p. 162. n. 7 (1890) (Moulmein) ; Pagenst., *Jahrb. Nass. Ver. Nat.* xliii. p. 101. n. 173 (1890) (E. Java) ; Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 10 n. 44 (1892) (Silhet ; Assam ; Java ; Sarawak).

Chuerocampa aetreus, Boisduval, *Spec. Gén. Lép. Hét.* i. p 257. n. 42 (1875) (Philipp. ; Java : Bengal) ; Snell., *l.c.* xxii. p. 67. n. 17 (1877) (S. Celebes) : Piep., *ibid.* xl. p. 97. t. 1. f. 8, 9 (horn of *l.*), p. 100. t. 3. f. 1—3 (larvae) (1897) (Java).

Metopsilus aetreus, Kirby, *Cat. Lep. Het.* i. p. 661. n. 11 (1892) ; Hmwe, *Berl. Ent. Zeit.* xl. p. 365. n. 29 (1895) (Java).

Theretra aetea (?), Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 100. n. 158 (1892) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 412. n. 158 (1898) (Sikhim, Bhutan ; up to 6000 ft., vii.—ix. ; *l.* and *p.* deser.).

**Panacra butleri* Rothschild, Nov. Zool. i. p. 80 (1894) (*hab.?* ;—Mus. Tring).

Theretra aetreus, Semper, *Schm. Philipp.* ii. p. 402. n. 47. t. 6. f. 4—7, t. 11. f. 1, 2 (*l., p.*) (1896) (Luzon ; Cebu ; Bohol ; Mindanao ; Palawan).

Panacra butleri is based on a defective specimen in which the green colour has changed into reddish tawny.

♂. Tenth abdominal tergite as in most *Theretra*, gradually narrowed to end, truncate, feebly sinuate, the edge rounded ; sternite as long as the tergite, gradually narrowed to a point, apex somewhat curved upwards. Clasper with more than twelve large scales ; harpe elongate, subcylindrical, horizontal, very feebly curved, apex concave on upperside, slightly spoon-shaped in dorsal view. Penis-sheath with a single dentate process (Pl. LVIII. f. 15).

Hab. Ceylon to North India, eastwards to the Moluccas.

In the Tring Museum 1 larva, 1 pupa, 50-odd specimens from : Loo Choo Is. ; Ceylon ; Travancore ; Sikhim ; Assam ; Penang ; Borneo ; Nias ; Java ; Lombok ; Sambawa ; Sumba ; Buru.

CLXIV. CENTROCTENA gen. nov.—Typus : *rutherfordi*.

♂♀. Differs from *Theretra* in the shorter spur of the midtibia bearing a comb of stiff bristles as in *Nephele* (Pl. LXIV. f. 8). Cavity at end of first segment of palpus large and well-defined ; second palpal segment broader than long. Abdomen with conspicuous tufts at the ventral edges of tergites 4 to 6. Distal margins of wings somewhat scalloped.

Abdomen peculiarly striate above and below, reminding one of the American *Xylophanes ceratomioides* and allies.

Early stages not known.

Hab. Africa.

Two species :

External discal lines of forewing above undulate 747. *C. rutherfordi*.
External discal lines of forewing quite straight 748. *C. imitans*.

747. Centroctena rutherfordi (Pl. X. f. 9, ♀).

**Panacra rutherfordi* Druce, *Ent. Mo. Mag.* xix. p. 16 (1882) (Cameroons ;—coll. Druce) ; Kirby, *Cat. Lep. Het.* i. p. 663. n. 14 (1892).

**Panacra saalmülleri* Möschler, *Abh. Senk. Nat. Ges.* xv. p. 68. n. 153. f. 23 (1890) (Accra ;—coll. Staudinger) ; Holl., *Trans. Amer. Ent. Soc.* xvi. p. 62. n. 11 (1889) (Benita).

**Chuerocampa undulata* Aurivillius, *Ofv. Vet. Ak. Forh.* lvii. p. 1050 (1900) (Congo ;—Mus. Stockholm).

♂ ♀. Interspaces between discal lines 3 to 6 of forewing buff, shaded with brown in front, undulate (like the brown lines) from R^3 apicad.

♂. Tenth abdominal segment of the usual type, as generally found in *Theretra*: tergite rather narrow and obviously curved, tip faintly sinuate; sternite rounded at end. Clasper with about a dozen large scales; harpe with a long, slender, horizontal, cylindrical process, which is slightly curved upwards at end. Penis-sheath peculiar (Pl. LVIII. f. 16), reminding one of that found in *Theretra lucasi* and *clotho* (and allies); a large dorsal patch of erect, somewhat curved spines, the tips pointing distad; the spines breaking off easily.

♀. Vaginal plate resembling that of *Th. lycetus* (Pl. XLI. f. 17), but more triangular, the edge of the vaginal cavity also asymmetrical, not so prominent as in *lycetus*.

Hab. West and East Africa.

In the Tring Museum 1 ♂, 3 ♀♀ from: Gold Coast; Congo (Bentley); Yakusu, Congo (K. Smith): Ngnela, German East Africa.

748. Centroctena imitans.

**Panacra imitans* Butler, *Ann. Mag. N. H.* (5). x. p. 432 (1882) (Delagoa B.; — Mus. Brit.); Kirby, *Cat. Lep. Het.* i. p. 663. n. 13 (1892).

♂. Differs from the preceding in the grey mesial double line of the abdomen being much clearer marked, in the forewing being narrow, more strongly dentate, tooth R^2 being much more prominent than tooth R^1, and in some details of pattern: forewing, discal line heavy, 2 faint, 3 heavy, 4 faint, 5 heavy, interspace 4—5 white also costally, line 6 thin, none of the lines lunate as in *rutherfordi*, a black patch R^1—R^2 outside line 6: hindwing, pale discal area more distinct, with a rather conspicuous blackish line. On the *underside* the discal lines of the forewing are less oblique than in the preceding species, almost parallel to margin.

♂. Tenth sternite obtusely pointed. Harpe as before, but broader before apex, ending in a slender point. Penis-sheath very different from that of *rutherfordi*, the armature consisting of a broad flat right-sided process which is dentate at the end (Pl. LVIII. f. 17).

♀. Unknown.

Hab. East Africa.

Only 2 ♂♂ known to us, one in the British Museum from Delagoa Bay, the second in the Tring Museum from Ulugurn, German East Africa.

CLXV. RHAGASTIS gen. nov.—Typus: *celata*.

Pergesa Walker, *List Lep. Ins. B. M.* viii. p. 149 (1856) (partim; type: *porcellus*).
Zonilia id., *l.c.* p. 192 (1856) (partim; type: *Nephele funebris*).
Chaerocampa, Boisduval (*non* Duponchel, 1835), *Spec. Gén. Lép. Hét.* i. p. 223 (1875) (partim).
Deilephila, Staudinger (*non* Laspeyres, 1809), in Rom., *Mém. Lép.* vi. p. 230 (1892).
Metopsilas, Kirby (*non* Duncan, 1836), *Cat. Lep. Het.* i. p. 660 (1892) (partim).
Theretra, Dudgeon (*non* Hübner, 1822) *Journ. Bombay N. H. Soc.* xi. p. 411 (1898) (partim).

♂ ♀. Differs from *Theretra* in the second segments of the palpi not touching one another, the base of the tongue remaining visible; from *Cechenena* in these segments not being so narrow, bearing a large apical tuft on the inner-side, and having a much smaller naked area.

Larva known only of *mongoliana*; of the *Theretra*-type, with one ocellus.

Hab. Oriental Region, northward to Amurland and Japan, eastward to Borneo and Java.

The genus is a connecting link between *Theretra* and *Cechenena*, and is itself connected with *Theretra* by *Th. castanea* and *pallicosta*. Some of the species resemble each other rather closely; but there is really no great difficulty in distinguishing them, if one has once grasped the essential characters. The differences in the palpi, which we illustrate by some figures, will, we hope, convince even the most confirmed lumper of the distinctness of the insects.

Key to the species:

a. Hindwing below with conspicuous black stigma	758.	*Rh. albomarginatus.*
Hindwing below without a black stigma		*b.*
b. Second segment of palpus strongly narrowed to base (Pl. LIX. f. 17)	751.	*Rh. acuta.*
Second segment of palpus not narrowed to base (Pl. LIX. f. 18)		*c.*
c. Upperside of thorax flushed with red, underside of wings and body inclusive of palpus rosy red	757.	*Rh. gloriosa.*
Upperside of thorax not flushed with red		*d.*
d. Forewing above with a single series of sharply defined white submarginal lunules	755.	*Rh. lunata.*
Forewing above with two series of white spots or a broad ill-defined band, or without white submarginal markings		*e.*
e. Forewing above with a series of white submarginal spots, preceded by a straight white line from apex to R^2 and by a lunate line between R^3 and SM^2; underside of body and wings ochreous	756.	*Rh. olivacea.*
Not so coloured		*f.*
f. Cavity at end of first palpal segment distinct		*g.*
Cavity at end of first palpal segment vestigial	749.	*Rh. mongoliana.*
g. Underside of wings densely speckled with brown, marginal band of forewing not joined to brown basal area; no white submarginal scaling on forewing above; abdomen without yellow lateral stripe	750.	*Rh. velata.*
Underside less densely speckled with brown: marginal band of forewing joined to basal area between R^2 and R^3		*h.*

b. Costal half of cell of forewing below of the reddish colour of the disc; abdomen without yellowish lateral stripe; costal edge of forewing very pale, creamy . . . . . 753. *Rh. confusa.*

Cell of forewing below entirely brown; abdomen rosy beneath, a conspicuous ochraceous side-stripe; a broad white submarginal band on upperside of forewing . . . . . 754. *Rh. castor.*

Cell brown as before; abdomen below buffish white; the stripe connecting basal area with marginal band of forewing heavy . . . . 752. *Rh. aurifera.*

749. Rhagastis mongoliana.

**Pergesa mongoliana* Butler, *Proc. Zool. Soc. Lond.* p. 622. n. 1 (1875) (Nankow Pass, China to Mongolia; Japan; larva descr.:—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 637. t. 91. f. 14. 15 (*l.*, *p.*) (1877); id., *Illustr. Typ. Specim. Lep. Het. B. M.* iii. p. 4. t. 21. f. 5 (1878); Staud., in Rom., *Mém. Lép.* iii. p. 159 (1887); Leech, *Proc. Zool. Soc. Lond.* p. 583. n. 11 (1888) (Yokohama, common; Kiukiang).

Metopsilus mongolianus, Kirby, *Cat. Lep. Het.* i. p. 660. n. 3 (1892) (Mongolia): Leech, *Trans. Ent. Soc. Lond.* p. 268. n. 61 (1898).

Dilophila mongoliana, Staudinger, *l.c.* vi. p. 230. n. 218 (1823): Bartel, in Ruhl, *Grossschm.* ii. p. 129 (1900) (Amur; Corea; China; Japan).

Metopsilus mongoliana, Staudinger & Rebel, *Cat. Lep.* ed. iii. p. 104. n. 763 (1901).

♂♀. Second segment of palpus about as long as broad, not narrowed to base; cavity of first segment vestigial. External row of spines of first protarsal segment doubled and trebled. White lateral band of head and thorax distinct: metanotum with a patch of tawny and ochreous scales laterally, the patch extending on to the mesonotum, no black mesial dot; abdomen without lateral stripe. Distal margin of forewing more convex than in the other species, the fringe distinctly spotted, the four discal lines (or rows of dots) more distinct behind, followed at internal margin by a small brown patch, a similar patch at apex of wing. The brown border of the underside of the forewing dilated behind R^3, mostly reaching the basal area. As in *velata*, *aurifera*, and *acuta*, there occur specimens in which the outer disc of the forewing above is buff-colour near costal and internal margins.

♂. Process of harpe slender, somewhat ∿-shaped. Penis-sheath intermediate between those of *velata* and *aurifera*, the right process long, multidentate at and near proximal edge, especially near end, the left process slenderer, also multidentate at and near proximal edge (Pl. LVIII. f. 19).

Larva with one ocellus.—Food-plant: *Balsamina*.

Hab. Japan; Corea; Amurland; China.

In the Tring Museum 5 ♂♂, 10 ♀♀ from: Yokohama and Tokio, vii.; Kiukiang and Chu-su, China.

750. Rhagastis velata (Pl. XIV. f. 4, ♂).

**Pergesa velata* Walker, *List Lep. Ins. B. M.* xxxv. p. 1853 (1866) (Darjiling;—Mus. Brit.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 548. n. 5 (1877); id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 3. t. 78. f. 5 (1881); Cot. & Swinh., *Cat. Moths Ind.* i. p. 10. n. 54 (1887); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 10. n. 42 (1892).

Metopsilus velutus, Kirby, *Cat. Lep. Het.* i. p. 661. n. 12 (1892).
Chaerocampa velata, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 91. n. 137 (1892) (partim).
Theretra velata, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 413. n. 137. a. a. (1898) (Sikhim, Bhutan; v. vi., up to 4000 ft.).

♂ ♀. Second segment of palpus (Pl. LIX. f. 20) not narrower towards base, longer than broad, but not so long as in *aurifera*, cavity of first segment distinct. External row of spines of first protarsal segment simple, or doubled only at base. Metanotum without black mesial dot: abdomen without ochreous-tawny lateral stripe, or (rarely) the stripe vestigial on the last segments. The four discal lines of the forewing above, of which two or three are generally strongly dentate, form at internal margin a conspicuous *patch*, which is often continued costad, joining the patch situated near stigma, this latter patch not always marked. Underside of both wings much mottled with brown scales, forming mostly short transverse lines; the brown border of the forewing widened before R^3, sometimes almost extended to basal area. The clayish buff band on the upperside of the hindwing always narrow: it is best marked in the individuals which have the distal part of the disc of the forewing above buffish and the marginal border distinct, while it is vestigial or absent from the more evenly coloured individuals. It is peculiar that *aurifera*, *acuta*, *velata* and *mongoliana* each have two forms differing in the same way.

♂. The large scales of the clasper stand in pairs; harpe as in *acuta*, rather more curved. Penis-sheath (Pl. LVIII. f. 20) *symmetrical*, both processes with several irregular rows of small teeth at the proximal edge. Tenth sternite long, sides parallel, apex obtusely rounded.

Hab. North India: Sikhim; Bhutan; Assam.

In the Tring Museum 30 ♂♂, 4 ♀♀ from: Sikhim; Bhutan; Khasia Hills.

751. Rhagastis acuta (Pl. XIV. f. 13, ♂).

**Zonilia acuta* Walker, *l.c.* viii. p. 195. n. 7 (1856) (Hindostan;—Mus. Oxford).
Pergesa? acuta, Butler, *Trans. Zool. Soc. Lond.* ix. p. 547. n. 7 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 9. n. 52 (1887) (partim; Silhet): Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 10. n. 43 (1892) (India; Silhet).
Metopsilus acutus, Kirby, *Cat. Lep. Het.* i. p. 661. n. 13 (1892).
Chaerocampa velata, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. 91. n 137 (1892).
Theretra spec., Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 414. n. 137. c. a. (1898) (Sikhim; Bhutan; v.—viii., up to 4000 ft.).

♂ ♀. Second segment of palpus strongly narrowed towards base, triangular (Pl. LIX. f. 17), entirely different from the segment of *velata*, *aurifera*, etc.; compare also the inner surface of the palpi of *acuta*, *velata* and *aurifera* (Pl. LIX. f. 19. 20. 21); cavity of first segment large. External row of spines of the first protarsal segment doubled and trebled. In colour resembling *aurifera*, the subdorsal tawny-ochreous stripe of the abdomen at least vestigial; underside of thorax and abdomen buff, less white than in *aurifera*, the discal dots of the forewing below smaller, the marginal area not joined to the basal one; the marginal area of the hindwing narrower, not so much dilated before R^3. There are two forms connected by intergradations, but the intermediate examples are comparatively rare. In one form the ochreous-buff band of the hindwing is reduced, being often just indicated near anal angle; the forewing has scarcely a yellow tint, and the underside of both wings is dull clayish ochraceous with a tint of brick-red. In the other form the forewing has here and there an olive-yellow

tone ; the band of the hindwing is vestigial between 8^{c} and M^{1}, and the underside of both wings is brighter reddish and ochreous.—The marginal border of the underside of the forewing appears often above.

♂. Large scales of clasper (5 to 7) in two irregular rows appearing as one row ; harpe longer and slenderer than in *aurifera*. Penis-sheath (Pl. LVIII. f. 21) asymmetrical, the right process long, multidentate at end, rather broad, somewhat hand-shaped, the left process narrow, often very short.

Hab. North India ; Penang.

In the Tring Museum 48 ♂♂, 3 ♀♀ from : Sikhim ; Bhutan ; Assam ; Penang, 26. ii. '99 (C. Curtis).

752. Rhagastis aurifera (Pl. XIV. f. 7, ♂).

(?) *Choerocampa castor*, Boisduval (*non* Walker, 1856), *Spec. Gén. Lép. Hét.* i. p. 257. n. 41 (1875) (Darjiling ; Cochinchina).

**Pergesa aurifera* Butler, *Proc. Zool. Soc. Lond.* p. 7. n. 11 (1875) (Sikhim ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 549. n. 13 (1877) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 2. t. 78. f. 4. (1881) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 11. n. 60 (1887).

Metopsilus auriferus (!), Kirby, *Cat. Lep. Het.* i. p. 661. n. 19 (1892).

Choerocampa celata, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 91. n. 137 (1892) (partim).

Theretra aurifera, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 415. n. 137. a. b (1898) (Sikhim : Bhutan ; vii.—x., up to 7000 ft.).

♂♀. Cavity of first segment of palpus distinct ; second segment broadest at base, longer than broad (Pl. LIX. f. 21). Black apical scaling of antenna extending over 10-odd segments. External row of spines of first protarsal segment double. Metanotum with black mesial dot. Abdomen with a distinct ochre-buff lateral stripe from segment 4 to 7, the stripe often extending basad to segment 3 ; underside of abdomen, and meso-metasternum creamy white. Wings more elongate than in *celata* and *acuta*, the marginal area of the underside of the forewing joined to the basal area by a streak situated behind R^{2}, the row of dots of the same wing heavy. In some individuals the disc of the forewing above is buffish distally near apex of wing and posterior angle, and the brown marginal area of the under surface becomes also clearly marked above.

♂. Large scales of clasper arranged in one row ; harpe short, somewhat twisted. Penis-sheath asymmetrical (Pl. LVIII. f. 19), the right process rather long, broad, multidentate at end, the left process more proximal, short.

Hab. North India : Sikhim ; Bhutan ; Assam.

In the Tring Museum 36 ♂♂ from : Sikhim ; Bhutan : Assam.

753. Rhagastis confusa spec. nov. (Pl. XIV. f. 12, ♂).

**Theretra celata* var. *albomarginata*, Hampson (*non* Rothschild, 1894), *Journ. Bombay N. H. Soc.* xiii. p. 39. n. 137. t. n. f. 4 (1900).

♂. Palpus as in *aurifera*. External row of spines of first protarsal segment double only at base. Head and thorax with a sharply defined whitish pink lateral band, which is shaded with brown near the base of the forewing. Metanotum with indistinct black mesial dot. No tawny-ochreous subdorsal stripe on abdomen. Middle of sterna and underside of abdomen buff-pink, dusted with a few black scales.

Wings rather broader than in *aurifera*. *Upperside.*——Forewing as in *aurifera*, but darker in tint, costal margin pale ; fringe of hinder margin white

in middle, continuous with the pinkish white, longitudinal, subbasal line indicated in *aurifera* and other species.——Hindwing : pale band more pinkish and broader than in *aurifera*.

Underside.——Forewing : anterior half of cell reddish, not brownish black, of the same colour as disc ; the brown discal band just outside the basal area absent or only vestigial; at costal margin of fore- and hindwing ; the discal dots as large as in *aurifera* ; marginal band of forewing and the stripe connecting it with basal area less prominent than in *aurifera*.

♂. Penis-sheath (Pl. LVIII. f. 25) differing from that of *aurifera* in being more asymmetrical, and in the right process being broader and having teeth along the proximal and apical edges.

The total absence of a fawny-ochreous subdorsal stripe from the abdomen together with the other characters mentioned distinguish this insect obviously from *aurifera*.

Hab. North India : Assam ; Sikhim.

In the Tring Museum 5 ♂♂ from : Khasia Hills (*type*) ; Sikhim (Möller, Mandelli).

754. Rhagastis castor.

**Pergesa castor* Walker, *List Lep. Ins. B. M.* viii. p. 153. n. 5 (1856) (partim ; Java ;—Mus. Brit.)
Metopsilus castor, Kirby, *Cat. Lep. Het.* i. p. 661. n. 14 (1892) (syn. partim).
**Metopsilus amantiacus* Rothschild, Nov. Zool. i. p. 78 (1894) (*hab.* ?—Mus. Tring).

♀. Allied to *lunata*, but easily distinguished from it by the broad, diffused, ill-defined, whitish, submarginal band of the forewing and the blackish brown basal half of the underside of the same wing. Metasternum white in middle.

Hab. Java.

In the Tring Museum 2 ♀♀ from Java.

755. Rhagastis lunata (Pl. VI. f. 8, ♂).

**Charrocampa lunata* Rothschild, Nov. Zool. vii. p. 274. n. 3 (1900) (Khasia Hills : —Mus. Tring).

♂. Second segment of palpus not narrowed towards base ; cavity of first segment distinct, but not large. External row of spines of first protarsal segment simple, or irregularly doubled at base. Antenna longer and thicker than in *celata*, *acuta*, etc., the black apical scaling confined to the last 2 to 6 segments. Sides of abdomen with a broad blackish stripe, broadest and most distinct at base, dorsally bordered on segment 3 to 7 by an ochreous stripe which is more or less shaded with rufous red, as in *castor* and *aurifera*, these stripes absent from *celata*, *albomarginata*, and *acuta*.——Forewing, *above*, with a single white submarginal line, which consists of halfmoons, the horns of which point discad.——Hindwing with a sharply defined buff band, reaching to SC^2, indented at R^2, including a series of dots.——*Underside* pinkish red, the wings showing distally traces of the ochreous ground-colour, black basal area of forewing reduced to a streak or patch behind cell. Metanotum with a black mesial dot.

Harpe nearly as in *olivacea*. Penis-sheath also as in that species, but the left process much shorter.

Hab. North India : Khasia Hills and Sikhim.

Two subspecies :

a. Rh. lunata lunata.

**Chaerocampa lunata* Rothschild, *l.c.*

♂. Metanotum with a reddish tawny lateral spot. Lateral stripe of abdomen rufous red. Pale band of hindwing with four brown dots, the last one or two (upon M^2 and M^1) touching the black basal area or fused with it; fringe with white scales at least between M^1 and M^2, besides the white scaling at anal angle. Underside of wings very little or not ochreous distally, the black scaling before internal margin not entering cell. Left process of penis-sheath (Pl. LVIII. f. 24) reduced to a few teeth.

Hab. Khasia Hills.

In the Tring Museum 4 ♂♂.

b. Rh. lunata sikhimensis subsp. nov.

♂. Metanotum without reddish tawny spot. Lateral stripe of abdomen less red than in the preceding. Wings broader; pale band of hindwing with six brown dots, the last upon M^2 distinct, fringe without white scales between R^1 and M^2; underside of wings more distinctly ochreous distally, the brownish black basal area of the forewing just entering cell, continuous with the black discal dash situated between R^2 and R^3. Left process of penis-sheath longer and more hand-shaped than in the preceding.

Hab. Sikhim, 22. vi. '89 (G. P. Pilcher).

One ♂ in Mus. Tring.

756. Rhagastis olivacea.

Pergesa castor var., Walker, *List Lep. Ins. B. M.* viii. p. 153. n. 5 (1856).

Pergesa castor, Moore, in Horsfield & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 273. n. 630 (1857); id., *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal); id., *l.c.* p. 676 (1867) (= *velata* ex errore).

**Pergesa olivacea* id., *Proc. Zool. Soc. Lond.* p. 566 (1872) (Simla :—Mus. Brit.); Butl., *Trans. Zool. Soc. Lond.* ix. p. 548. n. 7 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 10. n. 255 (1887) (Simla; Sikhim; Silhet; Shillong).

Metopsilus olivaceus, Kirby, *Cat. Lep. Het.* i. p. 661. n. 15 (1892).

Chaerocampa olivacea, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 91. n. 136 (1892) (Simla; Sikhim; Silhet; Khasia; Shillong).

Chaerocampa castor, id., *l.c.* iv. p. 453 (1896); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 411. n. 136 (1898) (= *olivacea*).

Theretra spec., Dudgeon, *l.c.* p. 413. n. 137. n. a. (1898) (Sikhim; Bhutan; 3000 ft., vii.).

♂ ♀. Structurally nearly the same as *gloriosa*; harpe shorter and stouter, right process of penis-sheath more curved, left process longer and slenderer. Upperside of body and forewing of a peculiar greenish yellow colour, like the upperside of the abdomen and the irregular patches and bands of the forewing (ground-colour) of *gloriosa*. Forewing with a round black stigma, a white submarginal line consisting of more or less straight bars, preceded by another white line, which is broadened from tip of wing to R^2, and then uniform between the veins; discal lines reddish tawny, antemedian lines obscure, olivaceous. Underside orange-ochraceous, not dragon's-blood red as in *gloriosa*, the three discal lines distinct on both wings, except the second, which is often barely vestigial. Penis-sheath see Pl. LVIII. f. 22.

Hab. North West and North India.

In the Tring Museum 10-odd specimens from: Massuri; Sikhim; Bhutan; Khasia Hills.

757. Rhagastis gloriosa.

**Pergesa gloriosa* Butler, *Proc. Zool. Soc. Lond.* p. 246. n. 20 (1875) (Darjiling;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 549. n. 15. t. 92. f. 3 (1877); id., *Illustr. Typ. Spec. Lep. Het. B. M.* v. p. 3. t. 78. f. 6 (1881): Cot. & Swinh., *Cat. Moths Ind.* i. p. 11. n. 61 (1887).
Metopsilus gloriosus, Kirby, *Cat. Lep. Het.* i. p. 661. n. 20 (1892).
Chaerocampa gloriosa, Hampson, in Blanf., *Fauna Brit. Ind. Moths* i. p. 91. n. 135 (1892) (Sikhim); Dudg., *Journ. Bombay N. H. Soc.* xi. p. 411 n. 135 (1898) ("not seen"! Elwes: vii.).

♂♀. Second segment of palpus not narrowed towards base; cavity of first segment distinct. First protarsal segment with a simple external row of spines.

♂. Tenth tergite feebly dilated at apex, which shows a trace of a sinus; sternite narrow, obtusely pointed. Clasper with about half a dozen very large scales; harpe slender, horizontal, slightly spatulate (in dorsal view), feebly curved at end. Penis-sheath resembling that of *olivacea* (Pl. LVIII. f. 22), the left process broad and short.

Hab. N. India.

In the Tring Museum 10 ♂♂, 1 ♀ from: Sikhim, vi. vii.—ix.: Bhutan; Jaintia Hills.

758. Rhagastis albomarginatus (Pl. XIV. f. 8, ♂).

**Metopsilus albomarginatus* Rothschild, Nov. Zool. i. p. 78 (1894) (Khasia Hills;—Mus. Tring).
Chaerocampa velata, Hampson (*nec* Walker, 1866), in Blanf., *Fauna Brit. Ind., Moths* iv. p. 453 (1898).

♂♀. Antennal scaling pinkish white, not brown or black on the anterior side from near base to near hook as it is in all the preceding species, the black apical patch rather long; basal ciliae slightly prolonged in ♀. Second segment of palpus not narrowed to base (Pl. LIX. f. 22. 23.); cavity of first distinct. External row of spines of first protarsal segment simple, with or without a very few additional spines at the base. Metanotum with a conspicuous tawny patch at each side. Abdomen without dorso-lateral stripe. The external discal dots of the forewing above and below heavy; fringe of forewing spotted, a black spot near anal angle as in *mongoliana*. Pale band of hindwing reduced to an ill-defined patch or cloud near anal angle, fringe feebly dentate, white, with brown vein-dots.——Hindwing below with a conspicuous stigma, which is not found in any of the allied species.

♂. Clasper very broadly rounded at end; process of harpe slender (Pl. LII. f. 16). Penis-sheath (Pl. LVIII. f. 23) with a short paucidentate right process, and a more proximal left process which is dentate at the proximal and apical edges and bears also one or two teeth at the distal edge, the right process or both sometimes absent.

Hab. North India and Borneo.

Two subspecies:

a. Rh. albomarginatus albomarginatus.

**Metopsilus albomarginatus* Rothschild, *l.c.*

♂♀. Second segment of palpus (Pl. LIX. f. 22) about as long as broad. Costal edge of forewing at least partly creamy white.

Hab. Khasia Hills; Sikhim.

In the Tring Museum 7 ♂♂, 6 ♀♀ from: Khasia Hills; Sikhim.

b. Rh. albomarginatus everetti subsp. nov.

♂ ♀. Second segment of palpus (Pl. LIX. f. 23) longer than broad. Costal edge of forewing not creamy; basal area with white hair-scales, especially before hinder margin; brown basal area of underside of forewing rather more restricted than in the Continental form. Penis-sheath without processes.

Hab. Kina Balu, N. Borneo (A. Everett), 1 ♀; Benkoelen, Sumatra, 1 ♂ in bad condition (Eriesson); in the Tring Museum.

The difference in the palpus between the two insects is very obvious, but we think it does not indicate specific distinctness.

CLXVI. CECHENENA gen. nov.—Typus: *helops*.

Charrocampa, Walker (*non* Duponchel, 1835), *List Lep. Ins. B. M.* viii. p. 141 (1856) (partim).
Philampelus, id. (*non* Harris, 1839), *l.c.* p. 180 (1856) (partim).
Pergesa, Butler (*non* Walker, 1856), *Proc. Zool. Soc. Lond.* p. 246 (1875).
Theretra, Kirby (*non* Hübner, 1822), *Cat. Lep. Het.* i. p. 656 (1892) (partim).
Metopsilus, id. (*non* Duncan, 1836), *l.c.* p. 660 (1892) (partim).
Daphnis, Rothschild (*non* Hübner, 1882), Nov. Zool. i. p. 86 (1892).

♂ ♀. Second segments of palpi divergent, narrower in side-view than first segment (Pl. LIX. f. 11), not covering base of tongue (Pl. LIX. f. 10), the apical tuft of inner surface small, the naked space longer than broad (Pl. LIX. f. 26).

Hab. Oriental Region.

Six species.

There are three types of development in this genus, which perhaps represent each a separate genus.

a. Abdomen and forewing striped, the external stripes of the latter converging apicad; bristles of comb of midtarsus numerous and long; first segment of hindtarsus as long as tibia and as segments 2 to 5. Midtibial spurs equal, outer one often longer than inner. Here belong *lineosa*, *minor* and *pollux*.

b. Abdomen without lines; markings of forewing transverse; bristles of comb of midtarsus rather short and stout, less numerous; first segment of hindtarsus as before; antenna of ♀ incrassate distally. Midtibial spurs unequal. Resembles *Rhagastis gloriosa* in the style of coloration and in shape. One species: *mirabilis*.

c. Eye large; antenna not incrassate distally in either sex; spines of comb of mid- and hindtarsus long, thin, and numerous; first segment of hindtarsus as long as segment 2 to 4 only, shorter than tibia; prothorax long, mesothorax also projecting more than usually beyond the forewing, stout. Reminding one by the robustness of the body of *Pholus* and *Rhagastis gloriosa*. Two species: *helops* and *negrata*.

Key to the species:

a. Forewing above with five to seven almost straight lines in outer half, abdomen striped above . . . . . *b.*

Forewing above without these lines, abdomen not striped above . . . . . *d.*

b. Hindwing above with a well-defined ochreyellow band which nearly reaches costal margin, underside not pinkish . . . 764. *C. pollucta.*

Band of hindwing buff or pinkish buff, abbreviated, ill-defined . . . . . *c.*

c. Mesonotum without a pale mesial band, forewing with seven lines (inclusive of the feebly marked submarginal one) . . . . 762. *C. minor.*

Mesonotum with a pale mesial band, forewing with eight lines, there being an additional line between lines 6 and 7 . . . . 763. *C. linea.*

d. Forewing with a broad subbasal umber- or mummy-brown band or patch . . . 761. *C. helops.*

Forewing without that band . . . . . *e.*

e. Forewing dark green in basal area like thorax, underside red . . . . . 759. *C. mirabilis.*

Base of forewing with a black spot, otherwise of the same clayish colour as the rest of the wing . . . . . 760. *C. aegrota.*

759. Cechenena mirabilis.

**Chaerocampa mirabilis* Butler, *Proc. Zool. Soc. Lond.* p. 248. n. 25 (1875) (N.W. Himal.;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 554. n. 5. t. 92. f. 1 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 14. n. 82 (1887); Hamps., in Blanf., *Fauna Brit. Ind., Moths*; p. 93. n. 142 (1892) (N. W. Him.).

Theretra mirabilis, Kirby, *Cat. Lep. Het.* i. p. 650. n. 5 (1892).

♂♀. Antenna inerassate distally in ♀. External row of spines on first protarsal segment double at base; short spur of midtibia shorter than in the following species, spines of comb of midtarsus stout and rather short, those of comb of hindtarsus very little prolonged. Mesothoracic tegula with a long pale pink apical fringe.

♂. Tenth abdominal segment of the ordinary form as in *Rhagastis relata*, etc. Process of harpe much longer than in *Rh. albomarginatus* (Pl. LII. f. 16), but of the same shape. Penis-sheath resembling that of *Rh. lunata* (Pl. LVIII. f. 24), the right process rather longer, the left short and pancidentate. The number of large scales on the clasper larger than in *Rh. relata* and allies.

Hab. N.W. India.

In the Tring Museum 1 ♂, 2 ♀♀ from Simla.

760. Cechenena aegrota (Pl. X. f. 10, ♂).

**Pergesa aegrota* Butler, *Proc. Zool. Soc. Lond.* p. 246. n. 19 (1875) (Silhet;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 549. n. 12. t. 92. f. 2 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 11. n. 59 (1887).

Metopsilus aegrotus, Kirby, *Cat. Lep. Het.* i. p. 661. n. 18 (1892).

Chaerocampa celata, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 91. n. 137 (1892) (partim).

**Theretra catori* Rothschild, Nov. Zool. i. p. 75 (1894) (N. Borneo;—Mus. Tring).

**Daphnis chimaera* id., *l.c.* p. 86. t. 6. f. 16 (1894) (*hab.*?;—Mus. Tring).

♂♀. The type of *aegrota* is in very bad condition, but on comparison we find it to be the same species as *chimaera*, of which *catori* is only a peculiar aberrant individual, also in a bad state of preservation.

Abdomen with a black lateral line widening towards base, not distinctly marked on the first segment, thin on the posterior segments ; two rows of dorsal dots as in the allies of *Rhagastis velata*. Cavity of palpus almost closed.

♂. Tenth abdominal segment of the same type as in *Rh. velata*, *acuta*, etc. The harpe (Pl. LII. f. 11) compressed, dorsal margin notched, apex acute, curved upwards. Penis-sheath : apical edge produced at both sides into a dentate process (Pl. LVIII. f. 1), the right process (Pl. LVIII. f. 2) irregularly toothed, the teeth prominent, the left process (Pl. LVIII. f. 3) long, with minute teeth at both edges at end.

Hab. North India to Borneo and Java.

In the Tring Museum 2 ♂♂, 2 ♀♀ from : Java (Piepers) ; Borneo (D. Cator) ; Perak, viii. (Curtis).

761. Cechenena helops.

**Philampelus helops* Walker, *List Lep. Ins. B. M.* viii. p. 180. n. 12 (1856) ("Natal" *error loci* ; Moulmein *teste* Boisduval ;—Mus. Brit.).

Choerocampa helops, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 259. n. 43 (1875) (Moulmein, in Brit. Mus.).

♂♀. Cavity of palpus sharply defined. Sides of metanotum tawny, centre grey, this grey patch extended on to the mesonotum and abdomen. First and second segments of the latter with black patch at the sides. Stigma of forewing preceded by another small spot ; a broken apical line borders a tawny olive-brown costal band which stops sharply at R^1. The pattern of the underside of the same type as in *Rhagastis velata* and allies.

♂. Tenth tergite flat at end, truncate, very feebly sinuate ; sternite compressed, outline of under surface strongly curved in lateral view. Process of harpe almost cylindrical, apex obtuse, rounded (Pl. LII. f. 12. 13). The two processes of the penis-sheath (Pl. LVII. f. 48—53) much shorter than in *C. aegrota*.

♀. Side-edges of the vaginal plate rather sharply raised ; vaginal cavity large, the edge feebly raised, lyre-shaped.

Hab. Oriental Region.

Two subspecies :

a. C. helops helops.

Philampelus helops Walker, *l.c.* (1856) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 577. n. 15 (1877) (Penang ; N. India ; "Natal" ; = *orientalis*).

**Philampelus orientalis* Felder, *Reise Novara, Lep.* t. 77. f. 1 (1874) (Java ;—Mus. Tring).

Choerocampa helops, Boisduval, *l.c.* (1875).

Choerocampa orientalis, id., *l.c.* p. 259. n. 14 (1875).

Philampelus (?) orientalis, Cotes & Swinhoe, *Cat. Moths Ind.* i. p. 24. n. 130 (1887).

Daphnis (?) helops, Kirby, *Cat. Lep. Het.* i. p. 672. n. 16 (1892).

Chaerocampa helops, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 927. n. 139 (1892) (Sikhim ; Penang ; Borneo).

Theretra helops, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 412. n. 139 (1898) ("not seen").

♂♀. For differences in colour from following see below.

♂. Free process of harpe (Pl. LII. f. 12) three to four times as long as broad in middle. Processes of penis-sheath (Pl. LVII. f. 48. 49. 50) of nearly equal length, dentate, somewhat projecting away from the sheath.

Hab. N. India to Borneo and Java: most likely all over the Indo-Malayan Subregion.

In the Tring Museum 10 ♂♂, 5 ♀♀ from: Sikhim; Shillong; Jaintia Hills; Khasia Hills; Perak; Dinding, vi., and Pankor, ii. (Curtis); Benkoelen, W. Sumatra (Ericsson); Java.

b. C. helops papuana subsp. nov.

Daphnis helops var., Rothschild, Nov. Zool. ii. p. 482 (1895) (Germ. N. Guinea).
Theretra helops, Pagenstecher, in Chun, *Zool.* xii. 29. p. 13. n. 10 (1900) (Ralum, xii.).

♂. Abdomen more white beneath than in *helops helops*. Anterior tibia blackish brown externally.

Wings, *upperside*.——Forewing: distal margin more distinctly scalloped, apex more acute and more produced, fringe pure white between veins, especially near apex, black oblique apical line almost entirely replaced by a white line, upper discocellular spot larger than stigma.——Hindwing: pale anal patch larger, at M^1 5 mm. from outer margin, which is narrowly olive.

Underside.——Forewing: black basi-discal area reduced to a large discal patch and a streak behind M^2; postdiscal costal spot larger than in *h. helops*, fused with another black patch which is situated between it and the heavy apical line.——Hindwing: dots on veins much more proximal than in *h. helops*, dots R^3 and M^1 being situated *nearer* cell than outer margin.

♂. Harpe (Pl. LII. f. 13) shorter than in *helops helops*. The processes of the penis-sheath also shorter (Pl. LVII. f. 51. 52. 53), the right one much slenderer, simple.

Hab. New Guinea and Neu Pommern.

In the Tring Museum 1 ♂ (*type*) from: Milne Bay, xi. '98 (Meek). A ♀ in coll. Staudinger from German New Guinea. In the Berlin Museum from Ralum.

762. **Cechenena minor** (Pl. X. f. 11, ♂).

Chaerocampa minor Butler, *Proc. Zool. Soc. Lond.* p. 249. n. 30 (1875) (Masuri;—Mus. Brit.); id., *Trans. Zool. Soc. Lond.* ix. p. 562. n. 47 (1877); Cot. & Swinh., *Cat. Moths Ind.* i. p. 19. n. 102 (1887) (Sibsagar); Swinh., *Cat. Lep. Het. Mus. Ox.* i. p. 18. n. 70 (1892) (Laos, Siam).
Theretra minor, Kirby, *Cat. Lep. Het.* i. 656. n. 73 (1892); Rothsch., Nov. Zool. i. p. 75 (1894) (— *lineosa* exterr.).
Chaerocampa lineosa, Hampson, in Blanf., *Fauna Brit. Ind., Moths* i. p. 93. n. 143 (1892) (partim).
Theretra lineosa, Dudgeon, *Journ. Bombay N. H. Soc.* xi. p. 442. n. 143 (1898) (Sikhim; Bhutan; v.—viii.; partim); Leech, *Trans. Ent. Soc. Lond.* p. 284. n. 55 (1898) (Omei-shan; Chang-Yang).
**Theretra striata* Rothschild, *l.c.* i. p. 76 (1894) (Japan;—Mus. Tring); Leech, *Trans. Ent. Soc. Lond.* p. 285. n. 56 (1898).

♂♀. Thorax without pale mesial band; lines of abdomen less prominent than in *lineosa*. Forewing with *seven* lines in outer half, the short line 6—or line 3 counted from outer margin—completely merged together with 7, the latter generally blacker behind and somewhat undulate. The exterior spur of the

midtibia is generally of the same length as the inner one, but often longer, and sometimes a little shorter.

♂. Tenth sternite less triangular at end than in *lineosa*. Large scales of clasper asymmetrical, the proximal side of each scale enlarged, longitudinally folded or ribbed, darker than the distal side ; process of harpe (Pl. LII. f. 15) with indications of teeth. Penis-sheath almost symmetrical, apex rounded in a dorsal view ; the right process somewhat widened at end, dentate (Pl. LVII. f. 43), the left process (Pl. LVII. f. 44) vestigial only, there being but a few teeth on that side and no free projecting process.

Hab. North India to Japan and Siam.

In the Tring Museum 18 ♂♂, 2 ♀♀ from : Sikhim ; Bhutan ; Khasia Hills ; Shillong ; Formosa ; Japan.

763. Cechenena lineosa (Pl. X. f. 3, ♂).

**Chaerocampa lineosa* Walker, *List Lep. Ins. B. M.* viii. p. 144. n. 28 (1856) (Silhet ;—Mus. Brit.) ; Moore, in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. C.* i. p. 276. n. 639 (1857) (Darjiling) ; id., *Proc. Zool. Soc. Lond.* p. 794 (1865) (Bengal) ; Butl., *Trans. Zool. Soc. Lond.* ix. p. 562. n. 49 (1877) ; id., *Illustr. Typ. Specim. Lep. Het. B. M.* v. p. 9. t. 79. f. 7 (1881) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 19 n. 104 (1887) (Cherrapunji ; Silhet ; Sikhim) ; Hamps., in Blanf., *Fauna Brit. Ind., Moths* i. p. 93. n. 143 (1892) (partim).

Choerocampa lineosa, Boisduval, *Spec. Gén. Lép. Hét.* i. p. 264. n. 46 (1875).

**Chaerocampa major* Butler, *Proc. Zool. Soc. Lond.* p. 249. n. 31 (1875) (Darjiling ; Silhet ;—Mus. Brit.) ; id., *Trans. Zool. Soc. Lond.* ix. p. 562. n. 48 (1877) ; Cot. & Swinh., *Cat. Moths Ind.* i. p. 19. n. 103 (1887) (Sikhim ; Silhet).

Theretra major, Kirby, *Cat. Lep. Het.* i. p. 656. n. 74 (1892).

Theretra lineosa, Kirby, *l.c.* p. 656. n. 75 (1892) ; Rothsch., Nov. Zool. i. p. 75 (1894) ; Dudg., *Journ. Bombay N. H. Soc.* xi. p. 412. n. 143 (1898) (Sikhim ; Bhutan ; v.—viii. ; partim).

♂♀. Midtibial spurs as in *minor*. Thorax with a pale mesial band. Interspaces between the dorsal lines of the abdomen pale. Forewing with *eight* lines in outer half, third line from distal margin short, more or less undulate, abbreviated in front, or here joining the preceding line ; the three proximal lines of the same distinctness, or the middle one indistinct, which is generally the case when the interspaces are very pale ; intergradations between examples with pale interspaces —hence the lines conspicuously marked- and more uniformly coloured individuals are numerous ; those prominently striped individuals were described as distinct (*major*) by Butler. Sometimes the forewing and body as green as in *pollux*. The width of the pale band on the hindwing is variable individually, and its upper portion is mostly narrower and less distinct in Sumatra and Borneo specimens. Palpus see Pl. LIX. f. 10. 11. 26.

♂. Tenth sternite rather more pointed than in *minor*. Harpe (Pl. LII. f. 14) simple, not dentate, somewhat spoon-shaped. Penis-sheath (Pl. LVII. f. 15) asymmetrical, the right process (Pl. LVII. f. 46) slender, paucidentate, the left one broader, tongue-shaped, dentate at the edges (Pl. LVII. f. 47). The large scales of the clasper almost symmetrical, not heavily folded.

Hab. North India to Sumatra and Borneo.

In the Tring Museum 47 ♂♂, 8 ♀♀ from : Kumaon ; Sikhim ; Bhutan ; Assam ; Talum, Mal. Pen., i. (Robinson) ; Benkoelen, W. Sumatra (Ericsson).

The individuals from North West India seem to us to represent a separate subspecies, but we have not enough material to decide the question.

764. Cechenena pollux.

**Chocrocampa pollux* Boisduval, *Spec. Gén. Lép. Hét.* i. p. 261. n. 47 (1892) (Java ; Philippines ;—coll. Charles Oberthür) ; Semp., *Schm. Philipp.* ii. p. 400. n. 41 (1896) ("not receiv.").

Chaerocampa pollux, Butler, *Trans. Zool. Soc. Lond.* ix. p. 631 (1877).

Theretra pollux, Kirby, *Cat. Lep. Het.* i. p. 656. n. 71 (1892) ; Huwe, *Berl. Ent. Zeit.* xl. p. 365. n. 27 (1895) (Java) (= *pseudonessus*).

**Theretra pseudonessus* Rothschild, *Iris* vii. p. 299. n. 6. t. 5. f. 2 (1894) (Sumatra ;—coll. Staudinger).

♂ ♀. Resembling green individuals of *lineosa*, but easily distinguished by the band of the hindwing and the under surface being ochre-yellow.

Hab. Java ; Sumatra ; Philippines.

In the Tring Museum 3 ♀ ♀ from Java.

APPENDIX.

Psilogramma menephron (p. 42).

Pupa: tongue-case free, resting with end against breast. Glossy, smooth; abdominal segments punctured at base; metanotum with double or treble carina on each side. Cremaster broad, short, reversed cordiform; sides basally somewhat projecting; tip with two thin pointed processes.

Protoparce sexta (p. 67).

A series of pupae from North America exhibits considerable variation in the length of the free tongue-case. In a few specimens the "nose" is not straight but evenly curved, differing from that of *P. quinquemaculatus* only in being considerably shorter.

Protoparce leucoptera (p. 79).

Two ♀♀ from S.E. Albemarle, collected by Mr. Beck on March 26th and 27th, 1902, are rather better preserved than the specimen described and figured. The forewing bears the antemedian lines of the allied species, and three dentate discal ones, besides the postdiscal one. On the underside there are two discal lines on the hindwing, and one or two on the forewing.

Ceratomia undulosa (p. 107).

The short description of the pupa given on p. 108 is not correct. We have now received more material, and find that the pupa is, on the whole, slenderer than that of *C. amyntor*, coming near that of *C. catalpae*. It is rather more roughly and densely punctured than in either species, especially on the abdomen. The tongue is somewhat longer than the second pair of legs, but does not reach to the end of the wings, as it (always?) does in *amyntor*.

Hyloicus libocedrus (p. 132).

We have lately received a series of 10 ♂♂ of *lib. libocedrus* collected by Mr. Oslar near Prescott, Arizona. These fresh specimens all show a trace of yellow in the abdominal patches, but the yellow tint is much less distinct than in our rather old specimen of *libocedrus insolita*.

Kentochrysalis streckeri (p. 163).

We have received a larva and a pupa-case of this species from Messrs. Standinger and Bang-Haas. We give the following description of the pupa: Elongate, length 47 mm., width 11 mm.; with very little gloss. Clypeus produced, forming a large prominence which is shallowly sinuate, with the lateral edges projecting and dentate, the upperside slanting, and the underside in a plane with the tongue. Pilifer tuberculiform, a similar but lower tubercle on each side of the tongue at the base. Tongue a little longer than first pair of legs. Anterior femur not visible. The series of tubercles on the antenna prominent. Mesonotum granulose; a pointed tubercle on each side; two smaller tubercles on the forewing at the base. Abdominal segments dorsally densely and rugosely punctured, the punctures large; segments 5 and 6 finely rugose beneath, punctured at base, each laterally with two tubercles about 3 mm. distant from the spiracle. These tubercles resemble a shark's tooth; the upper one is the smaller. The segments slightly flattened ventrally between the two pairs of tubercles. Segment 7 ventrally heavily punctate at base, then rugose, the following segments with

large round punctures. Anal segment ventrally at each side with an obtuse conical prominence directed backwards. Cremaster long, slender, ending in two teeth, and bearing some small sharp teeth at each side.

The pupa is very unlike that of *Phyllosphingia*.

The larva is similar to that of *Sphinx ocellata*, but the head is less triangular, the granules are somewhat sparser; there are no enlarged granules in the last side-stripe, and the anal tergite is pointed. The rough horn is red, with pale upperside. Each tubercle bears a short hair. The annulation of the segments is not very distinct.

765. **Marumba nympha** spec. nov.

♂. Clay-colour, with a flush of pale vinaceous buff, especially on the thorax and forewing; sides of palpus, upperside of legs and scaling of antenna brownish black, mesial line of head and thorax also somewhat blackish; thorax crested; abdomen without mesial vitta; underside of body more ochraceous than upper. Antenna rather short, thickest before middle.

Wings, *above*.——Forewing: four lines between base and apex of cell, third and fourth closer together, all straight, but curving costad in front; a rather conspicuous whitish stigma, no brown bar upon cross-veins; first discal line situated as in *dyras* or nearer cell, second very faint, third rounded-angulate at M^1, here 7 mm. distant from outer margin, curving costad in front, crossing SC^5 about $2\frac{1}{2}$ mm. from subcostal fork; fourth line not double, parallel to third from costal margin to M^1, then continued straight to hinder margin; all the lines tawny, not prominent; spot M^2 encircled by a line; hinder margin and fringe of scalloped distal margin brownish black; costal area from base to fourth discal line, interspaces between third and fourth proximal lines, and between first and third discal ones, and broad distal marginal area, which narrows in front and behind, without vinaceous grey.——Hindwing: burnt-umber, darkest behind, where it is flushed with grey; anal spots separate; fringe pale in front, dark behind, here pale between veins.

Underside similar in ground-colour to upperside of forewing.—— Forewing: a brown shade in middle at lower angle of cell, continued as a band towards costa; two faint lines on disc, corresponding to third and fourth discal lines of upperside, more straight from costa to M^1, situated in a vinaceous grey shade which extends from costal to distal margin.——Hindwing with three lines, first heaviest, at apex of cell, third weakest, almost parallel to outer margin.

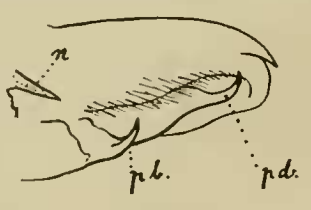


Fig. 4.



Fig. 5.

Tenth tergite quite different from that of any other species (Fig. 5): each lobe divided horizontally by an irregular sinus; sternite without mesial lobe. Dorso-apical process of harpe pointed, curved downwards; harpe (Fig. 4) with two curved processes, one proximal (*pb*), the other distal (*pd*), reminding one

of the harpe of *Rhodoprasina floralis* and *Agnosia orneus*. The two processes above penis-sheath pointed (*n*).

Length of forewing: ♂, 40 mm.

Hab. Karwar, N. Canara, S. India.

Three bred specimens known; two in the British Museum, *type* 17. viii. '97; the third, somewhat crippled, in the Tring Museum.

Easily recognised by the pattern of the forewing.

Mimas tiliae (p. 304).

The larva of *M. tiliae christophi*, of which Messrs. Standinger and Bang-Haas have sent us a specimen, agrees with that of *M. tiliae tiliae*.

Sphinx ocellata (p. 317).

On p. 320 we have referred to three hybrids as "*females*" with ♂-antennae. Prof. Standfuss informs us *in litt.* that the two specimens *populi* × *ocellata* bred by him are not *females*. We have now re-examined our two individuals in question, and find that we have been taken in by the thin antennae and the contracted abdomen. The two specimens prove on dissection to have a *male* sexual armature, and to possess eight external abdominal segments like normal ♂♂. There is, therefore, nothing remarkable in the antennae as stated, except that they are too thin for ♂♂, a sign of the weakening influence of hybridisation. We add that the ♂ *populi* × *ocellata* has the spikes of the penis-sheath nearly as heavy as the ♂ *populi*.

Amorpha populi populi (p. 333).

Add to the synonymy:

Amorpha populi ab. *subflava* Gillmer, *Allg. Zeitschr. Ent.* p. 375 (1902).
Amorpha populi ab. *decorata* Schultz, *Berl. Ent. Zeitschr.* xlvii. p. 288 (1903).

Phyllosphingia dissimilis (p. 338).

We have now 2 pupae and 1 larva, bought from Messrs. Standinger and Bang-Haas.

The pupa is very close to that of *Cressonia juglandis*. Black-brown, very rough, opaque. Head: two tubercles between bases of antennae; frons produced into three prominences, each sinuate at tip, one mesial and the others near eyes. Tongue much shorter than foreleg. Anterior femur not visible. Granules of antenna pointed. Mesonotum and base of forewing with a few tubercles. Abdomen flattened beneath, especially the last segments, irregularly grooved, minutely and densely granulose; upperside with sharply pointed granules, which are densest on the proximal segments; segments 4, 5 and 6 with a subapical belt of pointed tubercles, these tubercles vestigial or small on underside. The belt reminds one of that of *Pergesa elpenor* (etc.), but has quite a different position. Trace of horn distinct. Pointed lateral granules of eighth segment directed forward. Cremaster flattened, truncate, broad, the angles produced laterad each into a tooth.

Larva granulose, the granules dispersed; lateral granules denser and higher than the dorsal ones and each with a red wing round its base. Seven oblique side-stripes of enlarged granules, the stripes extending over two segments and

being bordered with red proximally, except on dorsum. Head large, conical, with few granules laterally ; a blackish brown frontal stripe on each side ; top of head incised. Thoracical legs red and black. Horn red, black above, with large dispersed granules. Anal tergite large, with dark-pointed dispersed tubercles.

Deilephila minima (p. 513).

The British Museum has lately received a series of specimens from Karwar. The individuals agree in colour and size best with the type of *min. ernestina*, while the armature of the penis-sheath, which is variable, conforms to that of *min. minima*, the right-side process being prominent and dentate. The occurrence of such dark-coloured specimens in South India renders it probable that the two individuals of *minima minima*, which is all that is known of that form, are accidentally small and pale. Bred specimens of *Deilephila* are often pale in tints.

Deilephila protrudens (p. 513).

The type (♀) is labelled "Moluccas, Lorquin" ; not Gilolo.

Xylophanes xylobotes (p. 690).

Among the unpublished drawings of Peters there is a figure of the larva and pupa of this species. The larva is green and agrees in shape with that of *X. ceratomioides*, tapering strongly in front and having a small head. An interrupted dorsal line and on each side a subdorsal one deeper green, the latter ending at horn and forming posteriorly the upper border of a white stripe which extends from horn to the tenth segment. A small white eye-spot on fourth segment. Traces of dark green oblique side-bands.——Pupa green ; a brown ventral mesial line ; stigmata also brown.

Xylophanes ceratomioides (p. 692).

Peters found on the plant (a small tree) on which he discovered the larva of *xylobotes* the larva of another species, which is doubtless that of *ceratomioides*, his figure agreeing fairly well with Schaus's description, except in the figure showing six oblique greyish side-bands and a small black ocellus encircled with pale.

Xylophanes hydrata (p. 706).

There is now in the Tring Museum a ♂ from the Province of Rio de Janeiro. The specimen agrees with the ♀ ♀ in all essential points.

Celerio (p. 713).

Add :

Hyles Hübner, *l.c.* (type : *gallii*).

Celerio vespertilio (p. 728).

Add the following hybrids :

Deilephila hybr. *eugeni* Mory, *Mitth. Schw. Ent. Ges.* x. p. 336. t. 1. f. 4. 5. 6 (1901).
Deilephila hybr. *lippi* id., *l.c.* p. 344. t. 1. f. 7. 8. 9 (1901).
Deilephila hybr. *pauli* id., *l.c.* p. 350. t. 1. f. 1 (1901).

Hippotion rebeli (p. 761).

We have lately received a ♀ from S. Arabia.

The following five new species were discovered in North-East Africa by Baron Carlo von Erlanger during his expedition from Addis Abeba to Kismayo : —

766. **Poliana micra** spec. nov.

♂. A duodez edition of *P. buchholzi*, in appearance like *Praedora marshalli* (Pl. V. f. 16). Legs as in *P. buchholzi*, but first segment of hindtarsus not longer than segments 2 to 5 together ; clasper with a similar patch of friction-scales.

Antenna longer than cell of forewing, stout, strongly compressed, slightly incrassate beyond middle. Occiput and thorax olive above, mesothoracic tegula with ill-defined black lateral line which is bordered with creamy white beneath ; abdomen with dorsal mesial row of black spots ; fringe of tergites chequered black and creamy white ; sides of proximal tergites with ill-defined blackish patches ; underside of abdomen dirty white, a series of small black mesial spots, standing at the bases of the segments ; breast greyish brown, palpus brown ; tarsi blackish, tips of segments and of mid- and hindtibia white.

Wings, *upperside*, similar to those of *Poliana buchholzi* and *Praedora marshalli*.——Forewing with white stigma, the pair of antemedian lines joined in middle to the pair of discal lines as in *Praedora marshalli* ; a postdiscal line more or less interrupted at the veins, parallel to the discal pair, slightly bordered with grey proximally ; a submarginal zigzag line ; fringe blackish brown and white.——Hindwing brown, greyish just behind cell, a very indistinct trace of a pale discal band ; fringe white, brown at ends of veins.



Fig. 6.

Underside greyish brown, base of hindwing grey, a pair of vestigial discal lines across both wings. Tenth tergite slender in dorsal view, very strongly compressed, being very much higher before end than broad, resembling in side-view fig. 27 of Pl. XXI. ; sternite very short, somewhat narrowed distad, apex sinuate. Clasper (Fig. 6) broad, dorsal and ventral margins almost parallel, apex rounded, slightly acuminate ; harpe raised into a slender, strongly chitinised, sharply pointed process, which stands some distance away from the ventral edge of the harpe, and projects dorsad and then distad, being dilated before the end, which is somewhat twisted ; friction-scales erect, forming a conspicuous crest, above which there is an impression covered with minute scales.

Length of forewing : ♂, 21 mm.

Hab. Ganale R., 13. iv. 1902.

ELLENBECKIA gen. nov. —Typus : *monospila*.

♀. Tongue vestigial, represented by two short lobes, covered with long scales. Pilifer long, with a few hair-scales besides the bristles. Genal process obtuse, short. Palpus small. Antenna incrassate distally, without distinctly prolonged

sèriated ciliae. Foretibia armed with some long spines externally, first segment of foretarsus about as long as the following three together, with some basal spines and a very stout apical one, second segment very short, also with a long apical spine; midtibia not spinose; spurs of mid- and hindtibia short. Pulvillus and paronychium *absent*. Spines of abdomen very weak. D^1 of forewing little longer than D^3; hinder angle of forewing completely rounded; R^2 of hindwing central.

♂ and early stages not known.

Hab. East Africa.

One species.

767. **Ellenbeckia monospila** spec. nov.

♀. Smoky grey; middle of head and thorax, above, blackish grey, underside nearly white: no markings.

Wings, *upperside*, grey, no transverse lines.——Forewing: a streak in middle of cell and one each on veins R^1 to M^1 from cell halfway to outer margin, and one on basal half of SM^1, very thin and black; a minute black stigma, and a rounded conspicuous black spot before hinder angle between M^2 and SM^2.——Hindwing: whitish grey towards base, veins deeper brown on disc.

Underside greyish white, forewing slightly darker grey distally; no markings.

Length of forewing: ♀, 21 mm.

Hab. Fader Gumbi, 22. iv. 1901.

768. **Polyptychus erlangeri** spec. nov.

♂♀. Palpus of ♂ rather prominent, obtuse, second segment elliptic in side-view. Antenna stout and long in ♂, reaching beyond end of cell of forewing, very strongly compressed and laterally impressed, not pectinate, in ♀ simple, slightly triangular in transsection. Spurs short, not spinose. Abdomen spinulose all over the tergites. No organ of friction. Head and thorax above grey, abdomen somewhat clayish; palpus beneath and breast mummy-brown; mid- and hindtibiae and -tarsi whitish above.

Wings, *upperside*, like thorax. ——Forewing: a minute subbasal blackish brown dot behind cell; two antemedian lines, suddenly curved costad before M, the first just outside base of M^2, the second barely traceable, near base of M^1, space between them posteriorly filled in with brown (bistre), this colour extending distad to discal lines and gradually fading away towards M and M^1; a very small brown ring as stigma; a double discal line situated nearly as in *fulguratus* (Pl. II. f. 14), followed halfway to outer margin by another line, parallel to the first except behind, where it does not follow the slight curve of the former, but remains nearly straight; this outer line with pale distal border, beyond which there is posteriorly a faint brown double spot; distal margin even, convex in middle, apex somewhat projecting, hinder angle a little more than 90°; outer area shaded with brown in ♂.——Hindwing grey in ♂ (rather rubbed), with traces of a discal double line, cinnamon-brown in ♀, without lines; apex rounded; distal margin slightly scalloped, long scales of fringe white between the veins.

Underside greyish cinnamon, an evenly curved, slightly denticulate, postdiscal line on both wings, approaching anal angle of hindwing.

♂. Tenth tergite slender, simple, slightly curved downwards, concave beneath,

apex rounded-truncate; sternite broad, triangular, simple. Clasper short, broad, apex strongly rounded; harpe not distinctly separate from clasper except at end, the apex projecting as a small triangular process separated from the ventral edge of the clasper by an incision. Penis-sheath without external armature; the innerside rough with a dense covering of minute teeth.

Length of forewing: ♂, 25 mm.; ♀, 28—31 mm.

Hab. Dahele, 25. iv. 1901 (♂, *type*); Gorgorn, 23. iii. 1901; Daroli, 6. iii. 1901.

769. **Temnora stigma** spec. nov.

♀. Allied to *T. natalis*, but forewing almost regularly dentate, not deeply sinuate between R^1 and R^3. Grey, middle of thorax black; abdomen slightly streaked with black above; a minute black dot behind each stigma.

Wings, *above*, grey.——Forewing blackish at costal margin; a small but very prominent black stigma; from costal margin near apex to basal third of hinder margin run some faint parallel lines, the first beginning at an obvious black costal spot, the last, which is the most distinct, at a smaller spot; beyond these discal lines comes a black band, beginning at SC^5, becoming faint at R^2, and widening behind into a large black triangular patch which reaches to outer angle at hinder margin; a black submarginal and a marginal band from R^1 to SM^2, separated from one another by a thin grey line, which is nearly 3-shaped behind; the marginal band is the broader; distal margin shallowly sinuate between R^2 and M^2, tooth M^1 less projecting than the others; fringe blackish, but creamy between veins SC^4—R^1, tips of veins excepted.——Hindwing: shaded with blackish brown; a blackish, ill-defined, submarginal band, fading away in front, reaching outer margin behind; distal margin denticulate.

Underside grey, shaded with brown.——Forewing: a black stigma; two vestigial discal lines from costal margin backwards, beginning each with a minute costal dot; first line not reaching R^3, second more distinct, extended to M^2; beyond them a blackish vestigial band, somewhat widened behind, corresponding to band of upperside which ends at a triangular patch; outer marginal area speckled with small transverse striae.——Hindwing with dispersed black speckles, which are denser near anal angle, forming here a black patch; two discal lines close together, confluent behind, black, abbreviated in front.

Length of forewing: ♀, 28 mm.

Hab. Between Addis Abeba and Kismayo; no special locality given.

Differs from *natalis* especially in the forewing, which is almost evenly dentate, has a prominent black stigma, is devoid of the double antemedian line and of the large black postmedian patch C—R^2, and is marked with a large black patch at hinder margin, which patch narrows in front and is continued as a band towards apex of wing.

770. **Odontosida erlangeri** spec. nov.

Similar to *O. pusillus*, a little larger. Antennal segments more strongly dilated dorso-laterally, subserrate in dorsal or ventral view.

Wings, *upperside*.——Forewing: grey, subbasal dot minute; the two antemedian lines wider apart than in *pusillus*, the second standing at base of M^1; first discal line as in *pusillus*, second a dark shade, third dentate at the veins,

with very small vein-dots, fourth and fifth lines geminate, not very distinct, accentuated by vein-dots, dots of fifth line heaviest on M^3 and SM^2, spot M^2 corresponding to the upper part of the oblique double spot of *pusillus*, no subapical costal spot; distal margin evenly dentate, teeth R^3 and M^1 not more prominent than the others: a brownish marginal area as in *pusillus*, but this area of about the same width between SC^5 and R^2, not being obviously narrowed costad, the brown submarginal halfmoon SC^4—SC^5 of *pusillus* not marked in the present species.——Hindwing more elongate than in *pusillus*, anal angle less projecting; clayish creamy buff, a pair of discal lines filled in with russet-brown, the first close to cell, even, the second dentate; a third line about halfway between first and distal margin, convex from C to M^2, then almost straight, slightly dentate on M^1 and M^2 (the teeth pointing basad), the line most distant from outer margin at R^1; distal area, outside the pale distal border of the third line, russet-brown, with small deeper brown spots on M^1, M^2, SM^2.

Underside grey, shaded with pinkish russet, costal margin of forewing, basal area and second discal interspace of hindwing pinkish grey, basal area of forewing isabella-colour; both wings with four lines across disc, second very faint, the others quite distinct also on forewing, parallel, the first on forewing 4 mm. from cell at R^2, on hindwing at lower angle of cell. Harpe broad, short, the obtuse apical portion produced dorsad into a very large tooth. Penis-sheath armed at end with a heavy, somewhat compressed, process, which projects sinistro-laterad and is obliquely rounded at apex, but ends in a minute point.

♀ and early stages not known.

Length of forewing: 23 mm.

Hab. Webi Maki, 1. x. 1900.

771. **Hippotion aurora** spec. nov.

♀. Upperside of head and thorax dark olive-brown, with a conspicuous pale side-stripe; mesothoracic tegula with a prominent pale yellowish middle line; a pale, simple, mesial vitta from pronotum to end of abdomen, accompanied on the latter by a blackish brown line at each side; abdomen paler than thorax, except at base, speckled with dark olive dorso-laterally, no black basal side-patch. Underside pinkish cream-colour, faintly speckled with olive; second segment of palpus and sides of breast dark olive.

Wings, *upperside*.——Forewing as in *H. eson*, much more grey, less clayish: discal lines 1 and 2 forming a band as in *H. eson*, but this band continued to the very base, being proximally almost black; line 6, which is as prominent from R^2 to apex as in *eson*, is very thin between R^2 and hinder margin, and accentuated by dots on the veins.——Hindwing nearly as in *H. osiris*, purplish red, deeper coloured than in *osiris*; the black discal area larger, its posterior portion not separated from the anterior portion, the red band-like space traversed by black vein-streaks; the post-discal black band less sharply defined than in *osiris*, tapering behind; the pale distal marginal border speckled with black.

Underside almost exactly as in *H. celerio*; no red colour and no distinct lines; brown distal marginal band of forewing more distinct than in *H. osiris*, and obviously broader than in *H. eson*.

Length of forewing: 38 mm.

Hab. Diego Suarez, Madagascar.

Received from Mons. H. Douckier, who also sent us a ♀ of *Temnora argyropeza* collected at Diego Suarez.

Agrees with *H. eson* in the upperside of the body and forewing, apart from the grey mesial vitta of the former and the conspicuous middle line of the mesothoracic tegula; while the upperside of the hindwing reminds one strongly of that of *H. osiris*.

This species stands in a similar relation to *osiris* and *eson* as does *H. isis* to *H. celerio* and *roscipennis*.

772. **Eurypteryx shelfordi** spec. nov.*

♀. Antenna cream-colour above, brown towards base. Body above russet-brown, perhaps greenish when fresh. Abdomen very broad, flattened, reminding one of *Rhodosoma* in shape, except in the seventh segment, which is conical and prominent, though much narrower than the sixth. Underside of body with a grey flush; tibiae cinnamon.

Wings, *upperside*.——Forewing like body, middle area and distal marginal area deeper brown, a round white stigma with a white dot in front; single creamy white scales dispersed over the wing, slightly denser in middle from R^3 backwards; a small creamy costal spot midway between cell and apex; a purplish grey ill-defined submarginal band from SC^5 to end of R^2, indistinctly continued to apex of wing; shape of wing as in *bhaga*, but the apex less produced and less acute, and the distal margin proportionately longer. Hindwing mummy-brown, cinnamon distally at and near anal angle; fringe paler.

Underside mummy-brown, with single widely separated creamy scales.—— Forewing: a creamy stigma, twice as long as broad; a chalky costal spot midway between cell and apex, continued backwards as a cloudy band; a grey oblique apical line bordered with brown in front from apex of wing to near R^2; marginal area limited by this line purplish grey, gradually fading away behind.——Hindwing: a purplish grey discal ill-defined cloudy area, within which there is a trace of a brown band; posterior half of wing from this area to base slightly shaded with the same purplish grey colour; D^1 about half the length of D^3; wing shaped as in *bhaga*, costal margin rather more dilated near base.

Length of forewing 46 mm.; breadth 20 mm.

Hab. Kuching, N. Borneo, December 1896.

1 ♀ in the Sarawak Museum. Named in honour of Mr. R. Shelford, the curator of the Sarawak Museum.

In the same Museum there are North Bornean specimens of:

Panacra malayana, ♀, not typical, from Kuching, December 1901;
Macroglossum passalus, ♀, from Matang, 3600 ft., June 1900, differing in several points from *pass. passalus* and *pass. rectifascia*;
Rhagastis acuta ♀, from Paku, February 1899;
Cechenena lineosa, ♂, from Mount Sibau, May 1902.

* Species Nos. 771, 772 came too late to hand to be included in the general account given on pp. vii. to cxxxv.

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